ENCYCLOPAEIDA OF
EDUCATION

M.S. PATNAIK

VOL
I

About the Book

The book envisaged by its title 'The Encyclopaedia of Education' is a long awaited book. The author having a mastery over the subject has written the book a lucid language. The book running in two large volumes is a welcome contribution to the field of education, especially, Distance Education.

In the present past high quality techanical studies, scuppered in the division between grammar and modern schools sank almost without a trace in the comprehensive school. Those who have crossed over the problem and brought technological level to this high have had to face extraordinary difficulties.

Without their long hard and success the present curriculam reform would have had to be promoted on a much water foundation.

Current moves have to break this mould and establish technological as well as essential curriculam of all children covering the full range of ability. But the government should sponsor and support this change without which the talent would not be able to succeed. And continue to direct the ablest from technological studies and in the direction what. We unmiskenly think of as untained, pure education.

The book is a very welcome contribution to the above mentioned field.

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Encyclopaedia

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M.S. Patnaik

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Preface

Education has always embraced vocational elements and aims. It has always combined eternal values and cultural objectives with the need to respond to the social, economic and industrial demands of the age. There is a school of thought which suggests that somehow, out of the muddy waters of life, we have distilled that essence which is called pure education. This, it is suggested, represents the knowledge and experiences which every developing human should have, and that these are eternal, unrelated to environment or society, and untrammelled by the shadow of a later need to earn a living. Indeed, the extreme expression of this viewpoint comes close to arguing that the more useful the knowledge and experience, the less reputable they must be. Such a curriculum exists only in people's imaginations. It does not exist in reality. It is not available to be defended.

When institutional change and curriculum reform are divorced, nonsenses are likely to occur. The irony is that high quality technical studies, scuppered in the division between grammar and modern schools, sank almost without trace in the comprehensive school. Those who successfully refloated the wreckage and have brought technological studies in schools to their present level have had to face extraordinary difficulties. Without their long haul and success the present curricular reform would have had to be promoted on a much weaker foundation.

Current moves have to break this mould and establish technological as well as other vocational studies as essential elements in the curriculum of all children, covering the full range of ability. Without the impetus of government-supported change, we shall continue to direct the ablest away from technological studies and in the direction of what we mistakenly think of as untainted, pure education.

Editor

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1

High Technology Training in Higher Education

As a result of a production boom in high technology hardware and software universities start to turn towards the sole application of high technology within their training courses. This phenomena will probably limit the applicability of engineers in several areas lacking high technology background. Since the international theatre in engineering cannot be taken as a fully equipped ground with high technology, therefore, universities might continue with traditional training, but the new technology must also be gradually incorporated in the existing, traditional courses.

Present conditions

Experiences and statistical data pointed towards two phenomena worth discussion. Firstly, the age of the senior staff in higher technical education can be placed between 40 and 65. This means that computers and related devices were not included in the curricula of their secondary or university education, therefore, a considerable bigger additional effort was required on their part to update their technical and scientific knowledge in this context. At the different faculties and departments, with the exception of the senior staff engaged in training and education in electronics and communication engineering, appr. 80 per cent of the senior staff is facing such a handicap.

National computer literacy programs which began a couple of years ago in primary and secondary schools, have created an additional demand in higher technical education towards courses with higher level of incorporated computer aid. This requirements was also supported by the quickly spreading computer hardware purchases of firms, companies, design offices and research institutions, too. For example, in civil engineering practice it was recognized and even stressed that computerization of research, design, manufacture and production and management was an economical and profit making investment. In higher technical education the institutes and departments have already acquired a certain level of computer hardware to improve both research and training.

The application of and research into high technology, developed locally or was adopted and relevant training should be dealt with by a staff familiar with it. This problem is solved partly by employing younger, specially trained staff members at the departments. However, it can be foreseen that following the retirement of the current senior staff and their replacement by upcoming new generations a probable switch towards sole computerization and a switch from traditional technical scientific thinking might soon develop.

International experience relating particularly to civil engineering shows that danger to the civil engineering profession occurs when computer software is dealt with as the "black box" in which certain data is inserted and the results come out the other side. Engineers must never forget the saying "Garbage in equals garbage out". Therefore, the engineers must remain an engineer first and last and computers can be used to support them in their everyday work.

The same applies to other high technologies *i.e.*, genetic engineering, as well. Of course, Computer-Aided Engineering, Design and Manufacturing/CAEDM/is one of the fasted growing industries, therefore, it is a job market for the students. This is why in higher technical education and not only technically or technologically fully trained and educated engineers should be produced: it must be remembered that an engineer whose work never lacks the service of the people should not become the extension of a machine or device or a computer keyboard manipulator.

Secondly, the know-how in high technology, sophisticated, sometimes very much abstract knowledge will, no doubt, create an interational elite and the gap between everyday users and this elite will certainly broaden. This might mean an "illiterate-literate" syndrome that should be avoided as much as possible on the part of both students and the senior staff by increasing their involvement and decreasing sole application and by homogenizing traditional technical sciences with conscious involvement while teaching and developing high technology.

Development efforts

A research project undertaken by the author together with an Associate Professor B.Juhsz of the Department of Reinforced Concrete Construction started more than a year ago and set a system of objectives for research consisting of the development of a structure for the management of theoretical lectures and practical sessions, the methods and the plan of their implementation for the application of computers in solving students; design and other computing problems and to develop the students' proficiency in making, developing, applying and controlling software applied in civil engineering with the help of traditional and computer aided complex laboratory and practical training sessions.

As the first phase of this project, a preliminary experiment began with the development of reference software. Since the Technical University of Budapest is considered world-wide as a recognized higher technical institution, therefore, large scale methodological experiments, lacking proper foundations, should naturally be avoided. The particular course of the reinforced concrete construction chosen for the first experiment was the one of reinforced concrete bridges and other structures in the 5th semester of the training of civil engineers. This course deals with stress analysis of the primary structural elements of reinforced concrete structures. By learning the subject matter of this course the students are made acquainted with the structural design of different reinforced concrete cross sections. This particular topic of reinforced concrete construction is the most often applied one in everyday engineering practice by consisting of a mass of work an engineer should perform. This is the reason why it was chosen as the specific subject where the advantages of computers can and should be utilized to cope with the requirements of accuracy in computations and of productivity in problem solving tasks.

The curriculum of the course was taken as it was, without any significant modification, only some reconsideration of the emphases applied previously were shifted towards new course of thinking through the presentation of the subject matter. The method applied here was an integrated concept that the students should learn the algorithms of the programs of the theorems together with their restructured traditional scientific deductions and presentations with a certain degree of concurrence at both ends. This meant that the traditional deduction of theorems, their logic, elaboration applied had to be adjusted to the requirements of the relevant software structure or algorithm. By this approach an impetus had been given to the students' course of thinking and it was assumed that, gradually, a developed problem solving capacity of the students could be the result arising from the software of their own, application, control and reliability. During practical training sessions the students should make, develop, individually or in pairs their algorithms and software based on restructure theorems. They control their work and face them independently. These programmes or software can already be utilized during the students' terms design projects and during their intermediate term tests requiring the making of operable programs or software.

The test evaluation and control have some new elements like consideration of both the software and its reliable use. It was evident that reliable software or programme could not be made if the student was not thoroughly familiar with the relevant theorem and its technical scientific principles. Software of this kind is useful in developing the required type of thinking on the part of students. The course content in our case, the subject matter could be divided into different small programs. This has provided a good opportunity to transfer theorems into program languages and programmes and of control and application. The other main advantage, however, was that out of these programs a merged complex program software could be developed covering the whole subject matter of the course for further use in the forthcoming courses and even, after graduation, during engineering practice.

2

Supporting and Assessing Higher Learning

While there is no single definition of the purpose of higher education (HE), few could doubt its role in preparing people for work in general and the professions in particular. This is reflected in the mission statements of many institution of HE. Sheffield Hallam University, for example, has clearly positioned itself as a national 'professional university'. As such, one of its primary concerns must be those educational processes by which an individual becomes a professional.

The definition of a professional has to be interpreted broadly; it cannot be restricted to those occupations requiring a licence to practise, or even those where chartered status is desirable if not essential. However, it should carry with it some implications about a person's competence in a work role, particularly his or her ability to carry out certain higher-level functions involving both specialist knowledge and judgment. In many vocational academic courses, the role of the workplace in developing such knowledge and skills is implicit; in others it is explicitly recognized and the process supported and assessed.

This chapter looks at a number of examples where academic credit has been awarded on the basis of what has been learnt at work by employees essentially performing their everyday duties. It draws on examples from areas where workplace learning has not been traditionally recognized as an essential part of the academic educational process.

Unfortunately, history is full of examples that experience is not in itself a guarantor of learning. Kolb argues that if we are truly to learn we have to go through a number of stages. We need to reflect on experience and to relate it to general principles, which in turn help us plan future actions. Many people need help to go through this process. In particular, they may lack the theories and concepts that would enable them to relate their own experience to a broader body of knowledge. What is learned is assessed entirely by the individuals performance in the work role as part of existing appraisal systems. Learners may never be required to particulate, or question, the principles that lie behind their actions.

Enlightened employers have always supported learning at work. People who went through a good apprenticeship scheme were not just sent to college once a week to gain an understanding of theory but were often given many additional hours of coaching by their workplace supervisor. However, while the world of education was willing to accept the learning that took place in its classrooms, it often ignored or treated as incidental the learning that was taking place during the rest of the week. It is not difficult to see why workplace learning might be ignored. Traditionally, courses in HE have been evaluated as much by their inputs as by their outputs. Content, subject development, entry requirements, learning and teaching methods and assessment procedures are regularly reviewed both internally and externally. In contrast, workplace-based learning is variable in terms of the range and quality of experiences offered to the learner. It is only relatively recently, with the development of the credit accumulation and transfer scheme, that HE has become willing to define the educated person in terms of demonstrated knowledge rather than the time spent in a classroom. However, it is not sufficient to acknowledge that learning takes place outside the classroom; we need to develop a methodology to help us put a value on what has been learned.

The difficulties academics find in writing learning outcomes for traditional degree courses are well documented. The process is even more complex for work-based learning because the ways in which knowledge is acquired, transferred and used are less explicit. Eraut for instance, in his work on management knowledge, identified six types of knowledge which he believed could also be found in other occupations. These were situational knowledge, knowledge of people, knowledge of practice, conceptual knowledge, process knowledge and control knowledge. They are briefly summarized here:

- *situational knowledge* – the way people conceptualize situations and adjust to them;
- *knowledge of people* – the basis on which people learn about and make judgements about others;
- *knowledge of practice* – simple factual information and knowledge of courses of action that might be appropriate;
- *conceptual knowledge* – formal and informal theories that guide behaviour and may be used to improve it;
- *process knowledge* – how to do things or get them done;
- *control knowledge* – self-management, self awareness and sensitivity, self-knowledge and self-assessment, representing the interface between doing, thinking and communication.

This is a very different picture of knowledge from one that might be used to describe the outcomes of a traditional taught course. This might include some knowledge of practice and processes, formal conceptual knowledge and increasingly, control knowledge, but the emphasis would be different. One reason for this difference is how such knowledge is used.

Erant argues that it is important to recognize that knowledge is transformed by the process of being used.

Further, much of the learning of new knowledge takes place while it is first being used, not when it was originally introduced. If we take the example of a student being told a theory in a lecture, he or she may be required merely to recall it and repeat it without any real thought in an examination. On the other hand, he or she may be asked to apply it to a particular situation, or use it, along with other theories and concepts, to interpret a particular situation. The student could be said to be demonstrating learning in any of these situations, but the knowledge he or she is displaying is different even though the original information was the same.

Clearly, this is already recognized to some extent and is reflected in changing methods of assessment in HE. However, the emphasis is still on transforming knowledge through application. It is easier to see how to transform knowledge acquired through experience into a form that can be assessed. An important element in experiential learning is association – the transfer of the principles of one situation to another. Association is largely intuitive and people may experience great difficulty in articulating the concepts and theories that they have used to arrive at a particular decision. Highly proficient performers are often unable to describe what they do, although, if pressed, they may provide some retrospective justification. This clearly creates a dilemma for those seeking to award academic credit for learning in areas that have not traditionally awarded credit for performance.

This separation of critical forms of knowledge is encouraged by a 'technocratic' model that divides professional education into three main elements. The student acquires a knowledge base, usually through the study of academic disciplines; this knowledge base is placed within a professional context, and the student is encouraged to apply it to practice in classroom problem-solving exercises: and finally there is an element of supervised practice. Bines argues that even where the rhetoric suggests that the supervised practice is a major element of the course, in reality it is marginalized or afforded low status. There is a sharp division of labour between specialists in the academic disciplines and the practice tutor, who is likely to be afforded a lower status.

Bines's arguments can be extended beyond that narrow range of professions that involve practice placements. There has been a great deal of rhetoric about the benefits of sandwich education. Much work remains to be done, however, on identifying the learning outcomes of periods of supervised work experience, and even more on their assessment and accreditation. Political pressures mean that supervised work experience is unlikely to remain as a relatively unmediated and unstructured experience if it is a funded part of an academic course. Unfortunately, this increased demand for improvements in the organization and curricula of placement is taking place at a time when resource constraints make it difficult to implement any necessary changes.

Although many organizations that employ sandwich student do demonstrate a high level of interest in the development and supervision of such students on their period of supervised work experience, it would be unreasonable to expect them to have the same level of commitment to them as they have to their own staff. It is hardly surprising therefore that much of the real progress in supporting, assessing and accrediting work-based learning has occurred with people who are full-time employees and only part-time students.

The next few sections of this chapter concentrate on a number of actual examples. They look at how various course planners set about identifying the learning that was, or could be, acquired in the workplace, and the relationship of that learning to what we normally expect at different stages of a student's academic development; how that learning could be supported; and, finally, how it could be assessed.

Identification of learning

The experience of many academics of the course design process in the not so recent past would have left them with the impression that it was about deciding what the content should be and how it should be delivered. Such decisions were often dictated by tradition, the requirements of a professional body, and the particular, and possibly idiosyncratic, interests of the staff involved. The aims of the unit and how it should be assessed were often an afterthought. Clearly, such an approach is not appropriate when designing learning that is to take place in the workplace and outside the direct control of the academic community. How then do academics set about designing workplace-based units?

One approach is to modify existing classroom-based units. This essentially was the approach taken by the course team on a part-time Housing degree where work-based units were devised without consulting employers or students. An analysis of the learning outcomes showed the typical academic bias towards propositional knowledge rather than process knowledge. More importantly, the relevance of some of that knowledge to students' current or potential work roles was unclear. The workplace was used as a learning resource, in the sense of being a source of information, but there was little effort to understand what students did as part of their normal duties or what facilities were available in the workplace.

When it was clear that such an approach would not work, the course team revised their approach. They developed a framework within which the students could reflect on what they were doing in the workplace, analysing and evaluating their own practice. The students were given responsibility for identifying their own learning, although the decision as to whether that learning was at the appropriate level remained the responsibility of the tutor. This approach encourages the student to present all six categories of knowledge described by Eraut..

The approach adopted by the second course team was to take as their starting point the test of competence set by their professional body. This team was attempting to reduce the amount of time it takes someone already working in a biomedical laboratory to get a degree. It is essential that such laboratory workers understand, and are able to carry out, standard procedures safely and effectively. Although much of the theoretical knowledge underpinning these procedures and be and is acquired through formal teaching, laboratories are still required to test the competence of trainees in the workplace.

After extensive discussions with staff in laboratories, the course team developed a series of units based on those activities which a trainee would have to do to satisfy his or her supervisor that he or she was competent. The Level One units that emerged were very much concerned with knowledge; knowledge of terminology, conventions, methodology, procedures, etc. In fact they greatly complemented what was happening in the classroom. By Level Two, it was clear that both the academics and the supervisors were expecting progression in the way students handled intellectual material, the complexity of the tasks undertaken, and the amount of supervision required. Because these units were described in terms of behaviour, they did not resemble a traditional syllabus. However, the academics had no doubt that they covered material that was at the appropriate level and developed the skills and qualities demanded of undergraduates at this stage in their educational development.

In the previous example, the basis for workplace-based learning was an existing set of occupational standards. This situation is likely to be more common with the growth of National Vocational Qualifications. The next case study looks at a situation where standards did not exist at the time the planning process began and had to be developed by the course team.

The university had undertaken a training audit of the estates branch of a government department responsible for the management of a large number of properties throughout the country. As is typical in the Civil Service, most people had served in a number joined the Civil Service as school leavers and nobody in the department was professionally qualified. Despite this, the level of technical knowledge and the quality of the work done by the staff was very high.

Changes in government policy had meant that the estates branch was taking on a greater responsibility for property management, and senior staff in the department were concerned that their apparently unqualified staff were at a disadvantage when dealing with other professionals. They approached the university about accrediting training courses. In the light of the audit, the university decided that, if it took the narrow view and just looked at formal training sessions, it would seriously undervalue the learning of staff. Instead it looked at the functions actually performed by staff and designed a number of units around the competences it identified. The end result was a Certificate in Estates and Property Management.

In designing the Certificate, the course team made it quite explicit that the programme must exploit the whole range of opportunities for employees to improve their knowledge, skills and performance. This ranged from unplanned learning in their current job, through planned directed learning from line managers and colleagues, to short courses and open learning material provided in the workplace. To get the Certificate programme validated, however, the course team had to address two important issues; how that learning was being supported and how it was assessed.

Supporting learners in the workplace

One of the chief concerns when learning is shifted from the classroom to a place of work is that the learners will have no one to support them in the process. While it is possible to build in tutorial support into a part-time programme, gaining the co-operation of the employing organization has clear advantages. It is easier to gain this co-operation when employers can see some personal advantages in assisting the learner.

Clearly, it is easier to persuade line managers that they should be helping subordinates learn when that learning is directly related to their performance in their work role. In the case of the original Housing units, which had been developed without consultation, line managers viewed college work as something that should be done at college or in the employees own time. They objected to their staff researching topics that took them away from their desks and which did not seem relevant to the successful operation of their department.

The approach taken by and to biomedical laboratory supervisors was completely different. As the units were designed around learning that the employee had to achieve in order effectively to operate in a laboratory, supporting the learner did not impose an additional burden. Furthermore, the course team saw its obligations as going beyond supporting the learner; it offered support to the supervisors too. It was stressed that supporting learning at work was a natural management role and should be seen as part of the staff development of laboratory supervisors. As the course team were essentially looking for people with the skills necessary to help people in their working roles, it was decided to use the term 'coach' rather than 'mentor'. Those responsible for coaching students were able to attend a short course at the university as part of their continuous professional development. These courses covered understanding how and why people learn, promoting a learning environment, preparing learning plans and ensuring that learning has taken place. They were also provided with a practical handbook on coaching skills.

The emphasis in supporting the workplace-based learning on biomedical units was not on supplying academic and technical material. This was available to them at the university as part-time students. Instead, it was on providing the right environment, in which learning would be encouraged and valued as a natural and essential activity in the workplace. The situation was more complex for those on the Certificate in Estates and Property Management, as learning was primarily managed in the workplace with no requirement to attend university classes. Central to the philosophy of that programme was the explicit recognition of both the learning cycle and different learning styles.

Unlike much traditional academic study, which tends to start with concepts but may not provide sufficient opportunities to apply them in practical situations, learning, particularly unstructured learning, in the workplace may well begin with practical experience. Such an approach may leave the learner with inadequate opportunities for reflection and reduce the opportunities properly to conceptualize and develop knowledge at a deeper level. The Certificate programme was designed to ensure that, whether the learner started with the theory or with the practice, all participants would go through all stages of the cycle. It did this through offering an extensive range of learning opportunities and by the use of learning plans.

All participants on the programme began with an analysis of their learning styles. From this they were encouraged to recognize their strengths and weaknesses as learners, and shown how to exploit learning opportunities as they arise. Each participant was actively involved in the planning of his or her individual training needs, and was given a trained coach who was responsible for encouraging and enabling the individual to exploit learning opportunities.

Recognizing that people learn in different ways, opportunities included short courses, OL material available in every location, and special practical assignments to cover areas of the syllabus that did not form part of that individual's regular duties. Managers were encouraged to give study groups access to meeting rooms and time to study. Senior management recognized that the best way of encouraging staff to take advantage of these opportunities was to show they were valued. This was done in a number of ways. Firstly, there was a regular newsletter to staff that pointed out the advantuages of the programme and publicized learning opportunities. Secondly, senior managers went through the programme themselves and led by example. At the time of writing, ways of linking the programme to the staff appraisal system were being explored.

People at work are already being assessed on what they have learned, either informally through day-to-day feedback from their line managers or, more formally, through appraisal and promotions. How do these processes relate to what is meant by assessment in academic institutions? The next section looks at some of the issues that arise when we seek to assess workplace-based learning for academic purposes.

Assessment and accreditation of workplace-based learning

In looking at how we can and should assess learning in the Workplace, there are a number of factors that must be taken into account. These can be put under three broad headings; relevance, credibility and feasibility.

Relevance is concerned with the extent to which the assessment process fulfils the identified purposes of assessment. Assessment can be used to achieve a variety of aims, some of which may be categorized as administrative, while others are more directly concerned with encouraging or enabling learning. The relative importance of these different purposes of assessment is going to vary, for the learner, the teacher and other interested partners. The different purposes of assessment may be complementary or they may be conflicting but, as a rule, as the purpose of assessment varies so do the ways in which it is carried out.

What are these purposes of assessment? Assessment can be used to select students. This can be a crude screening device to eliminate the number of candidates to a manageable number, or it may be based on a genuine assessment of their ability to cope with the next stage of the education process. This can be a particular issue with workplace-based learning, if the processes of acquiring and demonstrating knowledge are very different from what the student might expect in the future if they wish to continue with their studies.

Assessment should/can be used to 'maintain standards'. Employers, professional bodies, academics and students themselves need reassurance that certification has some meaning that is independent of time and place. This may be particularly critical with workplace-based learning, where questions are often raised about the transferability of knowledge and skills acquired in one situation to another. Assessment can be used as an extrinsic of students. It is known that students neglect work that is not assessed in favour of work that is. The situation is more complex for workplace-based learners because, in one sense, they are continually being assessed on their day-to-day duties. Where academic requirements are for something additional or very different, the learner may find that there is a conflict between what is required in his or her role as an employee and that which is required as a 'student'. Evidence suggests that when the learner is in permanent paid employment, it is the student role that suffers.

It is important to distinguish between the motivating effect of knowing you are going to be assessed and that of knowing how you performed in that assessment. Providing feedback to learners is very important at the beginning of any stage in their educational development. As they become more confident and autonomous as learners, they will become more capable of self-assessment.

In workplace-based learning, formative assessment may well be the role of the workplace-based coach or mentor. Such people may themselves lack confidence in giving advice and guidance on 'academic' performance, particularly where they themselves may not be 'academically' qualified. The learners' own supervisors, particularly when they have not been trained in coaching and assessment, may indeed be unsuitable if their motivation is poor. It goes without saying that if they are unaware of the educational objectives of workplace-based learning, they can hardly be expected to serve as effective assessors for academic purposes. However, if they have the appropriate technical knowledge in the subject field, although they may lack expertise in academic grading, they may be better than a university-based tutor in evaluation of competence.

While university tutors may have experience as assessors, they may not be sufficiently familiar with the student and his or her work to undertake diagnostic assessment. Even where they are familiar with the learner, perhaps through part-time study, they may consider that the students' area of work lies outside their discipline or area of specialist. Some tutors may object to the principle of awarding credit for learning that takes place outside the classroom if they see it as a threat to their livelihood. Further, if it is not recognized as a legitimate part of their workload, they may see it as an additional burden, and motivation to undertake such assessments may be so low that it affects their efficiency and the effectiveness of the process.

Regardless of whether assessment is formative or summative, it is unlikely that one single person is going to have all the characteristics we are likely to be looking for in an assessors. We require that person to be both objective and familiar with a particular case, to be an expert in both assessment and the subject matter he or she is assessing, and, finally, to be motivated actually to undertake assessment. This suggests that more than one person should be involved in the assessment process, which will probably comprise multiple assessments. The outcome of such a process is unlikely to be effectively summarized by a percentage mark or a grade. However, it is precisely this that is required if a unit is to count towards degree classification.

In all the case histories that have been described in this chapter, at least some of the assessment required students to make a presentation and not merely perform their usual working role. It is clearly a reasonable expectation of students seeking higher level credit that they should demonstrate underpinning knowledge and an ability to handle intellectual material at a level that we demand from student at that takes in their academic carear. However,this requirements has a more significant purposes in professional education than merely providing a hoop through which students must jump. Learning continues after the formal education process ceases if professionals are to continue to learn and to create knowledge, they must have the appropriate tools.

3

Management Information in Higher Education

The SEEB Survey and Its Origins

For the past four years a survey of entrants to a number of undergraduate courses at Plymouth Polytechnic has been undertaken; the survey consisting of a self administered questionnaire, and a small sample of follow up interviews designed primarily to check the data and to identify any problems arising with the schedule. The questionnaire covers the social and educational backgrounds of the students including the educational and occupational backgrounds of of their parents, family size, the routes that the students have taken through the education system, their qualifications, their experiences of unemployment and their reasons for entering higher education in general and for choosing particular courses within higher education.

The original impetus for the survey was sociological, a desire to ascertain the characteristics of students entering a polytechnic, to make comparisons with university undergraduates, and to begin to examine the extent to which the polytechnics might be offering wider access to higher education than the universities, particularly with regard to age and social class.

While such information is of crucial academic interest to sociologists and educationalists in a general sense, it also provides an important basis for the planning processes of a particular institution. In order to plan recruitment and publicity it is important to have knowledge of the backgrounds and attitudes of current students, both to focus more effectively on present markets and to be aware of possible new ones. The day to day running of the institution must also be enhanced by a more thorough knowledge of the characteristics and needs of the student population. With detailed local information the institution is better able to assess and adapt to the demands of the wider environment.

It was recognised, then, that the study should provide information that would have practical value for course and institutional planners as well as yield sociological data. The dual purpose nature of the study prompted the decision to survey all the students on each new intake of the degree courses covered by the survey rather than to sample. It was felt that this would ensure that the information would be seen to be as complete as possible. It was also important that the information should be available as quickly as possible to managers and planners so that with a target population of about a thousand undergraduates, computer analysis was essential.

The first activity was to design and test the questionnaire on a small sample of undergraduates. At this stage the project could well have met an untimely end, as the first author of this paper, a sociologist, sought help from a member of the computer centre and was advised to redesign the questionnaire in order that the analysis could be undertaken using an available statistical package for the social sciences (SPSS). Given that the small pilot survey had indicated that the questionnaire was effective in producing the desired information, this advice was not entirely welcome. It was at this juncture that the second author stepped in with a rescue offer of purpose written programs. The initial advice from the computer centre was well meaning, but indicates the dangers that can await uninitiated social scientists and educationalists, particularly the danger of the research becoming package driven.

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While it may be possible to overestimate the constraining nature of software packages, it is important not to underestimate the extent to which cooperation between those with little knowledge of computing and those whose knowledge is considerable can produce an atmosphere conducive to the production of ideas, both in terms of the particular subject specialism and in relationship to the analysis of data.

Just as it may be vital not to allow the research to become package or system driven, it is important not to lose touch with the subjects of the research, particularly if the research is on going. The interview programme for SEEB, primarily designed to allow for checking and updating has proved invaluable in suggesting areas for further investigation. In a general sense it is crucial that the data related to human subjects should not become remote from these subjects, dehumanized and therefore to a greater or lesser extent rendered less meaningful. In a particular sense keeping in touch with the subjects of the SEEB survey has meant that the students themselves have obtained educational benefit from their interest in the data, and new projects have been suggested by their expression of their needs, problems and interests. The researcher have, in fact, been especially anxious that their own "system" should not begin to drive the data; a fascination with the technicalities of the analysis must not be allowed to preempt the real goals of the exercise.

The survey and its analysis is undertaken in the main by two people, with a short term assistant being employed to code the questionnaires and enter the data. The data analysis and report writing being a "leisure" time occupation. Thus the current operation of the research is relatively small scale and from the point of view of the institution, cheap to run. The research was initiated via the interests of the researchers not commissioned by management, and given the shoe string nature of the operation was very much an exercise in exploration. No objectives had been set by commissioners, so that the initial questionnaire and its analysis was limited only by the time and energies of the researchers. With a project organized in this way it is relatively easy to respond to the requests of the consumers of the information for different types of presentation and analysis, or to drop elements of the study which are not seen to be of interest. Because of the relatively low costs it is also much easier to admit mistakes and to take steps to rectify them.

Implementing the survey

The First Stage: The initial stage of the survey, a pilot study of these undergraduate courses is shown in diagrammatic form. The results of this study were considered to be of sufficient interest for a research assistant to be appointed for three months to help with the coding of the questionnaires and with student interviews in a fuller survey of 1983 new entrants to undergraduate courses.

The second stage: The initial development of the survey. In the first year of the full survey 799 students completed the questionnaire, and 25 follow up interviews were undertaken. The questionnaires were post-coded largely because many of the questions, for instance those relating to attitudes towards higher education and reasons for choosing Plymouth Polytechnic, were open ended, as it was felt to be extremely important not to condition the responses. The extra time involved in classifying the answers and coding them was considered to be time well spent. The interview data were used as supporting qualitative data in subsequent reports, no attempt was made to codify this data in order to computerize it.

In the following three years the number of students covered by the survey increased to over 1,000, but the procedures have remained basically the same, apart from some minor changes in the wording of the questionnaire.

The main products of the survey are reports for circulation within the Polytechnic. The output is presented in the form of tables accompanied by fairly detailed discussion and explanation. The meaning that can be attached to the results is explored together with discussions about the implications for particular course and provisions within the Polytechnic in general. Comparisons are also made between the figures for the Polytechnic and those for the universities as contained in the reports of the University Central Council on Admissions.

The main areas discussed are the occupational class background of the students, family size, parental education, the age and area of home residence of the students, the routes taken through the education system by the students their O and A level passes, scores, and spread of subjects, their experiences of unemployment, job orientations, reasons for wishing to read for a degree, their reasons for choosing Plymouth Polytechnic, and whether a university or a polytechnic had been the first choice of the institution. The flexibility of the programs allows any of the variables to be run against any other variable and multiple analyses to be made. Thus the data can be explored in various ways, and a consideration of a variety of relationships can be made at the request of course tutors or managers.

The flexibility allows for changes in the presentation of the data over time, and for meeting special needs within the Polytechnic. The SEEB survey, then, allows an opportunity to explore a variety of relationships between the characteristics, backgrounds and attitudes of the survey students and comparisons to be made with national and international educational data. These explorations would not be possible solely on the basis of the information available on the application forms.

The information is, then, made generally available in hard copy form and can be used as an aid in monitoring students, course planning and recruitment. Variations in the intake from year to year can be observed and compared with national intakes, this knowledge can be used to contextualize the local Polytechnic experience and to inform any response to outside initiatives and directives.

Examples of the systems in use

1. A contribution to the debate on the projected future number of students in higher education in England and Wales.

   The first survey concided with the publication of the government's predictions of a fall in the demand for places in higher education. The findings of the survey were used to consider these predictions in the light of the characteristics of the Polytechnic undergraduates as compared with university undergraduates. The detailed information about the Polytechnic was used by the Polytechnic at the time in conversations with representatives of the Council for National Academic Awards and the National Advisory Body. There are obvious advantages in being able to enter national and local debates about provision and resources from a basis of detailed knowledge of the student intake. Among other things it makes it more difficult for commentators and planners to include the institution in generalizations which are not appropriate locally.

2. A contribution to the planning of the more "general" aspects of higher education in the curriculum.

   A knowledge of the spread of subjects available in a student group may help in the provision of the more "general" aspects of higher education centered upon the potential of the students themselves. Also important in this respect were the reasons given for choosing to enter higher education. The younger students gave predominantly occupationally related reasons, which suggest that the broader aspects of higher education should be fairly carefully contextualized. However, the older students were more likely to emphasize self fulfillment and general interest aspects of education and these attitudes might be drawn upon more fruitfully.

3. Uses for teaching material.

   The educational statistics are made available for teaching purposes. It has been found that the students relate to the material more closely because it has a personal as well as a general meaning for them.

4. Organizational changes that have been suggested from the data.

   (a) The general survey and the interviews pointed up the need for a cereche. Pressure had been increasing within the Polytechnic for such provision, the study provided evidence of demand and need among the students.

   (b) The problems of mature students in initially locating themselves within the polytechnic were also highlighted. Many of the students were unaware of the services available to them, and it has been possible to suggest adjustments within the system to accommodate some of their needs.

5. Research projects arising from the data.

   The survey data also suggested further research projects. For example, the characteristics of mature students as evidenced in the initial survey data, together with an indication of some of their specific problems, prompted an in-depth interview survey of mature students in the academic year 1984/85. A special request was also made for information on the attitudes of career officers towards Combined Studies Degrees, which because of the flexible nature of the operation could be accommodated.

Other specific projects include surveys of the provision of continuing education in the Polytechnic and the attitudes of staff and students towards this provision, and a study of the experiences of women engineering undergraduates.

These specific projects and the main surveys have provided material for papers read at national and international conferences.

The way in which the various activities within the overall project interrelate with each other and the adaptive nature of the research is perhaps best exemplified by the focus upon mature students that was suggested by the first survey. A research initiative on the experiences of mature students at the Polytechnic was already underway prior to directives from the National Advisory Body to polytechnics to improve their provision for continuing education. Thus some of the information necessary to the institution to facilitate the planning of such provision was already available and more specific research could be undertaken swiftly, and contextualized within the wider data.

It is important to emphasize that this identification of important areas within higher education has the potential to allow the institution not merely to be adaptive but also, more importantly, to be pro-active.

Actual and potential development

Some of the developments that have already taken place, as indicated in the last section, and some of the possibilities for future development.

On a limited scale the project is operating at Stage 3, but in order for full benefit to be gained from the feed back system, the project now requires further funding in the following areas.

1. The input of national statistics is being carried out on a limited basis but would require clerical and computing assistance for further expansion.
2. Research time and clerical assistance would be needed to input information regarding national higher education policy and local community interests.
3. The operation of the full processes of monitoring, initiating and contributing to internal and national debates, running research projects as well as producing the relevant written reports and information would require a full time commitment.

The project has arrived at a stage where it could continue to provide low cost but limited management information together with an, also limited, research initiative into educational issues and problems of both local and national interest, but it could equally expand into a much fuller information and research service. An expanded project could provide an extensive and flexible service to all parts of the institution, by feeding in information and meeting needs for particular research or teaching materials where appropriate. An expanded project could facilitate debate within the institution and awareness of changes in the environment of the institution which requires adoption or flexibility on the part of the organization.

The bottom up way in which the project has been developed thus far has required a relatively small expenditure from the Polytechnic, if albeit a large commitment on the part of the researchers. From the point of view of the educational managers it has demonstrated some possibilities in the provision of research based educational management information with a relatively low commitment from the institution. This type of development can now allow management to decide, from a position of knowledge about what the system can offer and how it might be developed better to meet the particular need of the institution, whether further investment should indeed be made.

One factor that should be considered in an institutional decision of this type is the extent to which an expanded project of the kind outlined above could provide a basis which could help to ensure that those in day to day control of the institutions of higher education can be managers, rather than administrators, activating policy rather than only reacting to external initiatives and directives.

4

The Social Impact of Technology on Society

The main forces to change university teaching within the years to come are on one hand the students who are widely dissatisfied with poor quality of teaching in contrast to high emphasis on research. On the other hand, there are industrial companies which are increasingly threatened by fast complex technological developments and they have to put up with university graduates who are up to the expectations of society under the impact of technology, its progress, failures and catastrophes. The impact of technology on society may be useful as a lever to bring about substantial change of university teaching and learning. Hence, we recently started a programe to raise awareness for and promote discussions on the impact of technology on society within our university. The aim of this staff development programme is to shape technological research and development projects at our university taking into account their societal and ecological effects.

Our university, the University of Technology (RWTH), Aachen, is one of the largest in the Federal Republic of Germany. Every year hundreds of engineers of all disciplines are graduating here. About 10% of them go on for a Ph.D. in engineering. Most of them do this in very close cooperation with industrial projects. This means they are working as junior researchers under the supervision of a professor in the framework of an industrial contract. The aim of the thesis is usually to develop elements of new technology to be introduced in industrial production.

We try to use this situation to promote a new approach to technological development at our university: from the very beginning of a university project on technological development, the researcher is asked to consider its future effects on man and society. We assume that the most important element in this approach is the consciousness of the researcher himself for possible effects and the strong intention to minimize negative effects of technological development.

Our programme has three main aims:

1. To encourage critical attitudes towards technological research and development at our university;
2. To cooperate with and to support junior researchers on issues of technological development;
3. To set up working groups of junior researchers encouraging them to develop further their critical attitudes towards technology.

In our seminars and workshops, we get together representatives from industry and from the university. The most important aspect of these activities is the confrontation of university researchers with those who are the users of new technological products, *e.g.*, industrial managers or workers.

As an example, a series of workshops give workers the opportunity to talk to junior researchers about their experiences with new technologies. The workers' representatives who report in these seminars are mostly unionists. They have the self-confidence needed to stand up to university researchers in discussions. In this way our university staff gain insight into the on-going processes of power-struggle between management and workers on issues of new technologies. In addition they learn about the effects of technology on working conditions.

Some other examples of workshops are the following :

- CAD/CIM
- artificial intelligence

- expert systems
- tele-homework
- biological waste
- traffic and its ecological impact
- energy supply
- communication skills and team leadership.

In our seminars on communication skills and team-leadership, we simulate and practice discussions and argu-ments on issues of society and technology as they take place in reality. Thus, junior staff experience a new insight into their roles as university teachers and researchers. They experience conflicts of a non-technical nature. For most of our engineers, it is a new experience they have to come to terms with.

In these seminars, we take into account the specific problems of women as part of the labour force. They are particularly affected by developments of new technologies which are the cause of rationalization, automation and tele-homework.

Another approach to reach our university colleagues are panel discussions with representatives of unions, industry, university and government. These discussions are attended by more than 200 listeners, mainly students. The large attendence stresses once more the importance of our concept.

It is important to personally involve professors into interdisciplinary cooperation on the issue of technological development. For this aim we organize different series of lectures. Each lecture is given in turn by different professors of engineering and social sciences. Another approach for this aim is to offer seminars for professors to get into close contact with modern industrial management under the challenge of new technology.

But these different activities are not sufficient to develop "human-centered technology". The individual problems of technical research are too different. Individual support is necessary. The usual situation of junior researchers is to suffer from lack of time. In spite of their individual motivation they are not able to develop the knowledge needed to integrate ideas of social effects of technology into their daily work. In this situation we facilitate the access to information and publications needed.

In addition we organize contacts to experts. These "experts" in our sense are the users of technology or those affected by technological development. The discussion with this kind of experts, the confrontation with their experience and ideas influence in a very fruitful way the process of research. It is not always easy to overcome communication problems. But it is difficult to find the experts who will be affected by future technologies not yet existing in industrial production.

It is obvious that the problems caused by the use of new technologies, come up again and again. These are mainly problems of automation and of introducing information networks. Besides the effects of rationalization we often observe negative consequences like problems caused by working with screens, the constraint of adaptation of human work to computer conditions, and the increasing possibilities of control of workers. Whenever similar problems arise in the course of a dialogue with a junior researcher we can offer experiences which our interdisciplinary team has available. In other cases we additionally refer to experiences of our colleagues in other disciplines, *e.g.*, social sciences.

When there are several researchers with similar research problems, we set up working groups comprising researchers and representatives from industry affected by technological developments. Their task is to re-design these engineering projects with the aim of reducing risks and dangers arising with these projects in a wider societal context. Until now we have established 15 working groups, most of them on themes like expert-systems, changing qualifications of workers, CIM, designing a railfreight terminal etc. Some other working groups deal with developing relation between the following groups:

- university
- trade unions
- professional association of engineers

In the beginning we offer these groups our assistance and support. But after a while the groups should be able to work on their own. We expect these groups to continue their work even after our project will have finished in 1988. We furthermore hope that the activities of these groups will lead to new projects.

The most interesting result of these efforts is the project to develop qualifications of workers in the Three-Nations-Triangle of the Sichen area. The qualifications aimed for include computer competencies, problem-solving strategies, team-work and creativity training. In this way, we hope to contribute to workers coping with new technologies.

The programme described is the first of its kind in the Federal Republic of Germany. It is supported by a grant of the Ministry of Work and Health. Our evaluation of the programme is based on a series of interviews with our colleagues involved in the different parts of our programme. The interviews have shown us that their involvement in the programme has brought upon a lasting impact on their views of technologies and society. In addition, these interviews have contributed to deepen the personal contact between our team and our colleagues across the University. However, we have only little indication so far that our colleagues are prepared to change their approach to engineering research. It will need more efforts to achieve visible changes of this kind.

5

Teaching and Learning in Higher Education

Few higher education institutions appear to have developed open and formal arrangements for student-oriented discussion of teacher innovation. The common forum for discussion of teaching is usually the course or departmental staff-student liaison committees which are driven by quality audit and assessment procedures. They have for the most part encompassed a duality of purpose, providing feedback within a staff assessment environment and thus separating staff from students, rather than promoting partnership. Such consultative committees and student feedback questionnaires are inherently reactive, allowing students to complain but discouraging praise and innovation. The student community suffers, of course, from its powerlessness and transitory status. Even the most democratically governed committees can effectively stifle student discussion and there is practically no effective forum for student consultation in the process of course development. Faculty committees ratify or at best modify course proposals with students comment deferred to as an afterthought. The long time-lag between innovation and practice means that students rarely see the application of their input. There are few opportunities for the student community to actually engage in discussion on a partnership basis with their tutors.

It was with considerable trepidation therefore that in response to the Flexible Learning Initiative at Loughborough

University, a survey of student opinion of projects from a number of academic departments was undertaken. This survey sought to encourage both praise and criticism and to assess the prospects for further development.

The aim of this study was to explore student opinion of teacher innovation in the following areas:

- satisfaction with flexible as compared with traditionally structured learning;
- factors making the development of flexible teaching less attractive to students and staff;
- the nature of special preparation and provision which might be needed in order to make the transition from conventional to flexible more fluid.

Methodology

This study was based upon structured interviews with the participants in the Flexible Learning Initiative Projects involving the following departments; Geography, English and drama education, Maths sciences, Design and technology, and the Engineering Design Institute. To carry out this research, the university appointed an independent researcher with a background in student union representation. This move was taken to add credibility to the student interview process.

The project tutors were of course self-selected through their involvement in the pilot projects. In addition to providing background information on their projects the tutors were also pivotal in establishing links between the students and the researcher, helping in many instances to set up the student interviews, freeing room space and/or teaching time to allow the interviews to take place. Tutors invited cooperation from their project groups, and so the study was based on an opportunity sample of those expressing a willingness to participate.

The students interviewed came from the diverse range of courses and therefore do not form a consistent sample regarding year to stage of study. They came from undergraduate and postgraduate groups, on and off site, full and part course units. Similarly no attempt was made to construct a representative sample based upon age, sex or backgrounds of the students.

Student interview groups were organized within each department and limited in size to a maximum of six students representing a sample of between 10 and 20 per cent of the total. Although the students were told of the purpose of the interview and were invited to reflect upon their experiences, they were not required or given any chance to prepare for the interview itself. They were assured of confidentiality from the outset although their cooperation was encouraged and invited, and therefore known by their tutor, their names were commonly not disclosed to the researcher. At no stage in the report process were individual comments attributed to names.

The first five minutes of the interview were occupied with the students completing a simple tick-box questionnaire exploring their experiences of diverse teaching techniques. This then formed the basis for the wider-ranging group discussion to follow. Interview time was set at half an hour. The interview discussions were recorded by hand during the interview with comments noted in full and written up within four hours of the interview.

We should finally consider the wider status of these student opinions. Should they be seen as individual comments, or are they representative of a wider community? While some of the students clearly attempted to speak on behalf of their absent colleagues, their comments on the whole must be taken as personal, drawing wider assumptions carefully. It is also important to recognize that many of the students' opinions were formulated as a group, having been encouraged to reflect on each other's responses during the course of what, in effect, became an open discussion chaired by the researcher.

Broadly speaking the six groups interviewed had experienced two different aspects of flexible learning, namely self-guided study material, and group work. The results will be presented accordingly.

Ownership and empowerment through self-guided study

Students from the following departments were taught through self-guided study units for various course elements: education, maths sciences, design and technology, and the Engineering Design Institute.

Students gave a number of reasons for their liking of self-guided study.

This was explained as a release in pressure that students felt from their more traditional studies, a pressure arising from an emphasis upon assessment: 'Its not pass or fail, there's no pressure'. Students clearly felt that the ability to work when and where they wanted was a clear improvement on their wider study experiences.

This notion of self-motivation was strongly connected in their responses with that of self-determination of priorities. Of equal importance was the chance to apply personal learner objectives to their work habits: 'You can work to your own level'.

Obviously this ties in with the release of pressure to achieve beyond the minimal levels of competence set by course requirements, and a student's personal level of subject competence. However, the students were also applying a commitment to each subject based on personal preference and/or priority. The 'own level' therefore applies to both the students' self-assessed level of subject confidence and to their level of priority.

If you want to look in deeper you can or you can skip it. Its important to be able to judge your own input on individual modules, to chose what's the most relevant to you.

This need to be in charge of their studies endorses the notions of student empowerment as discussed by several project tutors, encouraging the students to seize the materials and take ownership.

The actual provision of the materials was praised for facilitating the successful learning; Welcoming the inbuilt flexibility that characterized the self-guided study materials, allowing the students to gauge their starting level based upon their previous experience, they felt that this was '...more realistic'. Such comments again indicate a watering down of the pressure of a more conventional 'all in' mass delivery, acknowledging the student diversity now characterizing higher education.

For one student the materials from the engineering design project provided a far more substantial opportunity to learn successfully than the offer of empowerment and responsibility. This student felt completely confident in his ability to recall the material and topics covered in the study guide as it would appear that visual presentation and sequencing of the information closely matched his preferred way of taking pictorial/structured notes.

Perhaps the most easily overlooked advantages of developing innovative teaching within a more traditional teaching/learning environment is stated in the comment of one first year student who felt that the self guided approach, '...made a nice change'. The flexible learning projects were thus clearly placed within a wider context of conventional teaching, delivery.

In a later section of the interviews, the students were asked to identify their preferences as learners. The most common response was a mixture of both conventional and innovative teaching techniques. The remainder of the students were equally divided between those students siding more strongly with either self-guided study or conventional delivery of lecture/tutorial.

The skills benefits of self-guided study

All of the student groups interviewed were able to articulate the main benefit of self-guided work as being the chance to develop the skills of self motivation, discipline and time management.

You learn self-reliance, its all down to you

or,

You need to be able to sort yourself out.

One group of postgraduate students felt more confident in this area than the other groups, suggesting that post-experience students are more likely to have developed work/learner discipline. They also expressed a concern for undergraduates for whom it was felt that self-guided study would be a 'challenge'. Mature undergraduates also expressed concern for their colleagues from more traditional entry routes.

The demands of self-responsibility and time management were seen as having a beneficial influence on students' wider studies and study patterns. For many this was their first experience of such wide-ranging responsibility and empowerment, being more familiar with the demands of more conventional teaching. Arising from the general ability to manage their time, the students abstracted the ability to target and gauge their individual priorities. This was seen as having an important learning; on the 'own level, own pace' benefit of self-guided study as well as attaining a wider significance in the assessment of long-term targets and achievements. Of course, the process of establishing priorities means that some tutors will find themselves in the position of having their modules or pieces of work de-prioritized, as we shall see later.

The students were also able to identify specific study skills, perhaps of a more conventional nature. Those involved in the math module welcomed the opportunity to develop 'book skills' through the combined use of closely structured study guides and textbook. This was welcomed as a change to their usual pattern of learning which was dependent upon tutorial-and lecture-based dissemination of information. This learner objective had been built into the development of the project and it is therefore additionally helpful to know that such objective can be achieved and will be warmly acknowledged.

The advantages of group work

Students from the English and Geography departments participated in group work rather than traditional seminars under tutor guidance.

By far the most beneficial aspect of group work, as strongly emphasized by both group work projects, was the area of skill development or the acquisition of specifically 'non-academic skill'. While this was partly seen as a satisfying educational end in itself, some students expanded these benefits to the wider context of future participation in the job market. This issue of 'employability' was most strongly emphasized by final-year geography students who were pressingly aware of the need to prove themselves at interviews. The relevance of group skills to external, non-academic, working practices was also strongly emphasized by design and technology students, for whom this was of high personal importance, although they were not directly involved in group work through the flexible learning initiatives.

Specific group-work skills identified by the students emphasized delegation and self analysis, asking such questions as: 'What approach would best work for our strength?' Both project groups had warmly embraced the opportunity to target individual strengths and weaknesses and to arrange workloads accordingly, and both groups felt that they had used this skills stratification to achieve the optimum output. However, it was also seen as important that they avoid inter-group isolation of tasks and individuals. The student groups developed an awareness of the need to vary activities between small sub-groups and individuals within the wider groups environment.

Delegation and the development of responsibility encouraged students to embrace this responsibility and work to specific deadlines:

I tend to leave everything to the last minute but you can't do this here, so it pushed me along;

It was more difficult working in a group but the pressure was a lot better than drifting.

These students acknowledged and welcomed their responsibility to others, recognizing this as a successful and pleasing motivator, encouraging them to complete their work.

Another skill identified was that of giving and receiving feedback. Although it was commonly felt that this was a difficult skill to acquire and maintain under stressful conditions, the students felt encouraged by their, mostly negative, experiences:

I wasn't sure if I was ever going to speak to my friends again...but these were the most lucid arguments we'd ever had.

The students' experience of internal group dynamics played an important part in eliciting praise for this way of working. The group environment was described as being 'safe' and 'supportive', allowing and encouraging individuals and groups to face new challenges and attain new skills and subject understanding. Support reduced the pressure on individuals, permitting them to attempt rather than retreat from challenging demands. The conclusion of such a response was that group work was ultimately praised for creating the potential for greater reward and overall attainment, particularly with regard to final assessment outcomes.

The disadvantages of group work

While both pilot project groups welcomed the potential skill benefits arising from their participation in group activity, they felt dramatically unprepared for the task at hand. Of primary importance to both groups were the difficulty of inter-group communication and the process of sharing and accepting responsibility.

An important element of this was trust - 'How do I know that the others will do the work?' Exploring this issue more fully, the students discussed a fear of compromising their own skills and targeted level of output. This worry was most strongly expressed by two mature students from separate projects who were anxious about 'carrying along' their younger colleagues: 'Mature students have more motivation'.

This fear of compromise was of course closely related to final assessment.

In all areas the students felt that significant prior experience of group work would help to relieve some of the tensions regarding assessment and the competition/ compromise dilemma. Students involved in innovative group work called for a fully integrated group and individual learning environment right from the first year of undergraduate study. They were unanimous in stressing that if faced with similar demands for which they felt unprepared in the future, they would reject them in favour of competently handled lectures and tutorials: 'Give us back our lectures!'

An important though clearly separate skills shortage was perceived to exist among their tutors, namely the process of building student groups and the orchestration of groups activity. Concern was expressed over the casual formation of 'accidental' groupings left over from previous groups exercises. It was clearly felt that each group should be 'built' according to the individual exercise at hand and the particular strengths and weaknesses of the individual students. 'Accidental' groupings were seen as being 'stifling' and 'inappropriate'.

Many students expressed a fear that if a group 'went wrong' their marks would be severely damaged. While stressing the general potential for raising their marks, they were all too aware of the equal potential for disaster. The need for tutors to be able to assess and monitor groups performance at an intermediate stage or stages and successfully intervene if and when appropriate, was seen as being vital to student confidence. Tutors should also be able to change groups around from task to task to reduce compartmentalization of weaknesses and tensions.

Put into contemporary language, these combine to present one of the principal prejudices against developing flexibility, that 'students just aren't what they used to be'. It is a common feeling in higher education today that students lack motivation and discipline, desiring only to be spoonfed. Such sentiments are also echoed by clearly well-intentioned staff, with several of the project tutors couching their opinions in terms of the educational integrity of promoting self-responsibility amongst learners.

This study has revealed several new angles on this belief. First, it is clear that all of the student groups interviewed identified and welcomed the potential for self-improvement arising from the new emphasis upon student autonomy. Second, it is also true that few of the students actually confessed to having the necessary skill. Even those students who were enthusiastic about the materials and had felt comfortably in control of their work, could not confidently acknowledge their ability to manage their own time and exercise self-discipline. Identifying the need for personal motivation, one postgraduate student asked, 'But isn't that something you're meant to grow into?'

Conversely the minority of students who did feel prepared and motivate, all post-experience and mostly postgraduate, would have preferred an alternative, more conventional method of delivery. This same group suggested that this method of learning may be more appropriate to under-graduate, 'traditional' students.

In conclusion there would appear to be a danger in drawing too simplistic a dividing line between traditional undergraduates and post-experience under-and post-graduates. However, we can draw some significant conclusions concerning the influences affecting the successful implementation of autonomous learning. In discussing their experience of teaching innovation, the students highlighted several key demotivators which restricted their successful development of autonomy, and it is these we shall discuss next.

Learner confidence

The most commonly experienced demotivator for all the groups interviewed was in the area of learner confidence. This can be most clearly expressed in the oft-repeated phrase, 'How do you know whether you're learning the right thing?'

This emphasis upon establishing and learning the 'right thing' was found at all levels, from first-year undergraduate to post-experience post- graduates, and in all courses from maths to English. These latter students found themselves looking foı an authority figure in the form of a tutor to, put the discussion back on the right tracks'.

Even in the subjective study of literature it would appear that students still need the reassurance of the 'right' answer. Such a crisis of confidence was discussed on a variety of levels. From a different perspective, students involved with the study guides wanted to be led through more than one textbook to provide comparative views. One student was satisfied with solely preparing his own notes directly from a textbook and study guides, missing the handouts and other tutor inputs from lectures and tutorials. This wasn't as simple a matter as desiring to be spoonfed, for he went on to say:

While having an obvious impact upon resources, this call for multiple referencing more closely mirrors, perhaps, the endless learner pursuit of the right answer rather than any inherent learner laziness.

Perhaps all too often tutors overlook the pressure to succeed arising out of an assessment-led culture. Similarly, tutors may also forget the 'novice-initiate' status of the student, possibly facing up to their learning for the first time. Do we need to switch from assessment-led training to learning-led education?

The students seemed to feel that this issue of learner confidence was best resolved, or at least that their concerns were best minimized, when their lack of confidence was addressed through periodical assessment and feedback. Without intermediate feedback one student described attaining an 'artificial sense of success and achievement' once the self-guided study material had been completed. This was echoed by several different students, expressing some degree of confusion over what they had actually done and achieved. It is important to not only assess the attainment of subject understanding but to validate the students' adopted strategy of work. Has the offer of autonomy paid off? Have the students successfully guided their own learning and assumed proper responsibility? How can a students' learning process be authenticated?

Interim assessment is seen as one important motivating factor, giving the 'leave everything to the last minute' brigade some intermediate focus points for their output. Feedback arising from assessment also gave the students reassurance, providing them with the confidence to proceed from one stage to the next. In a similar vein, several students praised the provision of interim tutorial sessions, providing them with 'live' validation of their individual work as well as opportunities to secure help should they need it. Overall, the self-guided course with the most structured contact time, utilizing lecture test and tutorial, was the combination most warmly welcomed by its students.

The issue of learner confidence also arose when discussing the benefits of 'own level, own pace'. Students felt unsure as to whether the inherent flexibility built into the study guides to cater for diverse previous experience would allow them to miss out important information. Conversely, would it be too easy for them to skip through, thus again inducing a superficial sense of success? Where it was clear that no right or wrong answer was available the students were thrown into some confusion over how easy it might be to cheat: 'Can we cheat by just ticking everything?'

The assessment/learner confidence conundrum was expressed in its most extreme form when students were asked about the pros and cons of the wider development of flexible approaches.

The role of tutor as motivator in the development of student autonomy is therefore an important one.

Related to this wider development of self-guided work were the concerns of a first-year group that if increased numbers of students from across the university were studying away from their departments, there would be problems with the overcrowding of halls of residence. If students are asked to work at home the traditional use of study rooms within halls becomes deeply problematized. Would this provide a suitable working environment? These students honestly outlined a plethora of distractions arising from an over populated hall during the day time, ranging from the noise of others to the ease of avoiding work—'I think I'd rather play badminton'. The community living environment in this instance threatens individual study and limits access to quiet areas and times.

Student confidence also surfaced with the rather unexpected announcement made by one student that she did not feel confident in the self-guided material because she could not, mess about with them. I do all my work on the PC. But I couldn't even photocopy this and make mistakes and rearrange things.

The actual ownership of the materials and the perceived inability to personalize the document thus limited her confidence, effectively alienating her from the project. Inflexibility of this sort is thus another perceived demotivator, threatening already fragile learner confidence.

Other demotivators

Pivotal to the issue of student acceptance of teaching innovation was the issue of their wider current experience of teaching and learning in higher education. Two students had prior experience of flexible approaches, one from the Open University and the other from sixth-form college, but for the majority this was a new experience, finding a learner-oriented approach original and, to a lesser extent, challenging. For some this challenge was a welcome one: 'It made me get on with it' for others, less welcome: 'I felt intimidated and threatened.

One interview group had reacted negatively to their whole project and while this cannot be taken to be representative of that entire area of development, it does point towards one of Rogers' basic principles of learning.

Learning which involves a change in self organisation– in the perception of oneself - is threatening and tends to be resisted.

In rejecting the self-study materials this group was perhaps the most articulate in exploring their own weaknesses as learners, somewhat despairingly announcing their reliance on pressure and 'leaving everything to the last minute'. These students listed a series of challenges that, for whatever reason, they felt unable to accommodate, including unfamiliarity with assessment criteria, uncertainty of purpose and complete disregard of the tutor's perceived, and much hoped for, student empowerment.

As mentioned earlier, the impact of change itself cannot be underestimated. While the new approaches constituted a 'nice' change they were also seen in a wider focus as being 'too demanding. It is often assumed that, like swimming, independence and discipline are learnt by being plunged into the water and offered a little guidance. However, the testimony of the students has confirmed that their fear and distrust of the 'plunge' will limit their cooperation with tutor-led innovations in teaching. If students are unsure about the motives for change, as well as the new ground rules for innovative teaching and learning, they will dig their heels in and resist change with frustration and obstinacy, perhaps suspecting the tutor's ulterior motives.

Such threats can, as has been shown here, include the challenging of one's perceptions and expectations of higher education. This perhaps led to the post-experience students requesting conventional deliveries, such as lectures and tutorials. These students were also reacting to a need for change:

We direct our lives at work, we want something rather different from our education.

Another demotivator is the occasional lack of the learner confidence which can be gained from assessment and feedback. While the students were dismissive of informal assessment, they were generally in favour of small-scale periodic diagnostic assessment, affirming both subject attainment and work strategy, discussing this in terms of confidence to proceed. Learner confidence needs to be inspired by more than a chatty prose style or visual design.

Assessment was also seen as part of a partnership between staff and students. Put bluntly, it shows that the students aren't the only ones doing the work. For one student operating without intermediate opportunities for feedback, 'The time commitment alone warranted some form the feedback'.

Another group put this more firmly, having reacted against their tutor's initiatives. These students felt that they were being asked to do all the work and had not acknowledged the process of empowerment, initiated by the innovative change. The inherent danger in promoting flexible approaches as a chance to free-up contact teaching time is that the students will perceive this as a denigration of their educational experience, and revolt rather than cooperate.

Student priorities

In the dawning age of flexibility we need to acknowledge that having been offered the freedom to choose, students will want to exercise this right. This will involve saying no as well as yes. If we are to cater for individual prior experience and personal priorities we must accept that students will apply these to their studies and are indeed already doing so, in spite of the system rather than because of it. The student interviewers stressed several influences upon their personal priorities. Perhaps the most significant of these was an assessment of demand, asking two simple questions: 'What work does this involve?' and 'How does this relate to my other studies?'

"Demand' covers module weighting as well as intermediate assessment methodologies and other rewards. Differing methods of assessment from module to module mean that students are continually encountering assessment periods throughout their term of study, as opposed to the traditional end-of-term/end-of-year model of assessment. In this respect, tutors cannot afford to view their module in isolation from the other demands being placed on each student. In a busy schedule, longer-term reward clearly attains high individual priority. In this context students were equally clear in their rejecting of informal assessment, inevitably relegating its importance as a time-wasting exercise. Although assessment and feedback were identified as essential to the development of learner confidence, an emphasis upon assessment results in value judgements being made and priorities affirmed.

Weighting and reward seemed to drive the students more than personal interests, although perhaps now that they were studying on a module, their interest in the subject may have been assumed and not raised in discussion. While workload plays a role in the development of personal priorities, students, in expressing choice, will also develop a prioritized strategy based upon their own learner objectives and interests. Several of the pilot projects were dismissed as being 'uninteresting' or as having less relevance to their individual needs, referring more to course content rather than the actual delivery of material.

Drawing conclusions

Learners and learner skills

Perhaps it would be useful to now place some of the students' comment in a wider context, reflecting upon how these comments affect the wider implementation of teacher innovation within a traditional institution of higher education.

The most significant contributing factor to the 'give us back our lecture!' lobby was the perceived skills shortage experienced by students when faced with the new challenges presented by teacher innovation. While this was particularly true of the group work projects, it was also echoed by those disastisfied with the self-guided study materials. Cornwall puts this as follows:

> Too often it seems, students and their teachers are plunged into new ways of teaching and learning on the assumption that they can pick up the new skills needed.

The group-work students felt unprepared to communicate and to negotiate delegation of responsibility successfully while the self-guided study groups particularly lacked the ability to motivate and manage their own time. The groups asked to make presentations were equally concerned that, '...students just do not know how to present information'. At no time had they been trained in the required skills and could only point to their various tutors as role models, a situation which was not seen as being particularly satisfactory.

Perhaps the most important lesson to be learnt here is that the rigours of developing innovative teaching place parallel demands upon those responsible for the learning. With innovative teaching comes innovative learning. Unfortunately, while we may pilot our teaching— either materials or method—it is perhaps impossible with current restraints to pilot learning, as bound as it is with the wider context of a student's entire programme of study.

It is common in higher education today to find programmes pushing the gradual and exploratory development of staff skills across the institution. As teacher innovation spreads across the institution, staff skill shortages are gradually being addressed as they become apparent, a fledging strategy, which is, however, considerably more advanced than that for the development of the student community. The problem of developing teacher innovation within a more traditional institution is that the projects are clearly fixed, from the student perspective, within a wider context of conventional teaching and learning. This conventional context is of paramount status due to its longevity and its commonality, and does not provide students with the necessary skills and breadth of experience to meet new teaching and learning requirements. When students reject such innovation it confirms tutors' worries that they can no longer encourage or force their students to plunge into flexible learning on the grounds that they will either sink or swim. We need to be more proactive in empowering our students and equipping them with the skills necessary to take full and confident responsibility for their learning.

Students were equally articulate in their call for specific, timetabled opportunities for skills development, or a move towards rationalizing skill-specific learner objectives. Quoting the example of final-year students with 12 modules, one group felt that it was no longer appropriate for tutors to give out lengthy, unannotated reading lists. When they had pushed for some change through their course representative they were told that lengthy reading lists would do them no harm and were specifically devised to encourage the acquisition of research and information-gathering skills. The students wanted to reject such a random approach due to time constraints, preferring such skills to be targeted at a specific area of work: 'I just haven't got the time to go through this again and again'.

Thus we can see that students are calling for two main developments in the wider context of teacher innovation. First, they want their skills shortage to be acknowledged and appropriate strategies implemented to rectify this. Second, any such strategy should be coherent, stating specified learner objectives, rejecting the more random sink-or-swim model of conventional strategy. Each institution and each course tutor needs to ask themselves where they are in developing such programmes.

This study has thrown up the need for training in group work and presentation skills alongside the delivery of more traditional skills such as note-taking and information-gathering. However, each new teaching style adopted will require a different configuration of skills, covering both presented by teacher innovation. While this was particularly true of the group work projects, it was also echoed by those disastisfied with the self-guided study materials. Cornwall puts this as follows:

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> Study skills provision is a key factor in helping less confident learners across the transition from conventional to flexible learning.

Adequate skills training would also add a much called for vocational element to their studies, an element which might also fall into the personal prioritization and motivation framework through the delivery of possible and identifiable rewards.

Core or periphery?

How far can these changes go? The students were very clear in their answer to this question. When asked whether or not these innovations suited them, they were again unanimous in stating that:

> It depends upon the difficulty of the module. This wasn't the most difficult and therefore I found it easier to relate to self-guided study. It also wasn't the most important.

Other students discussed the issue of centrality particularly relating to confidence in teaching techniques:

> It is good to experiment but it depends upon the particular subject. If a major area of work, you want the confidence of an established method of delivery. We need to know that it works.

There are, it would seem, 'suitable' and 'unsuitable' modules and areas of work, a statement echoed by the project tutors themselves. The most significant factor in suitability would appear to be the proximity to the core of the particular subject area. Apart from English, and to a lesser extent, geography, the projects studied here were largely developed in supporting, rather than core, areas.

The relative key to the overall development of innovative teaching would appear to be the importance or status of the chosen subject matter. The chosen subjects cover background theory, practice and principle, preparing students for the main areas of work. Perhaps these are low-risk strategies adopted at the outset to avoid catastrophe. This procedure can be seen to be repeating itself. Many of the new projects submitted to the Flexible Learning Initiative office cover similar supportive areas of work such as basic drawing skills or remedial mathematics. Could these be the subjects no one wants to teach, as suggested by one project tutor, as they lack the glamour of weightier subject areas?

The student interviews also point to a wider pressure limiting the scope of change, namely the pressure to succeed. Students have invested large amounts of money as well as opportunity in their courses, perhaps rightly focusing on ongoing reward and final degree classification. The message is clearly that it is valid to experiment but the students need to know that it works where and when it matters. This concern can of course be mirrored in the attitudes of the course tutors themselves. Teaching is a very personal skill and, for many, methods will have been built up over a period of years. In this respect, learner and tutor concerns and confidence in new methodologies are of equal importance.

The validity of student review

In many ways the very inadequacy of this survey is evidence enough of the need for a greater emphasis upon student review. Perhaps there is also enough evidence to suggest that a closer, developmental relationship be initiated between staff and students.

The students involved in this study were honest and thorough in their discussions, proving to be as equally perceptive of their own weaknesses as learners as they were in offering insight into the strengths and weaknesses of the pilot projects themselves.

6

Practical Problems in Higher Education

Establishing a new framework for higher education and setting down the government's plans for it may be regarded as a major milestone in educational policy. Significant expansion was clearly one of the government's targets - whereas in 1991, one in five 18-19-years-olds enrolled on HE courses, the target of one in three was set for the year 2000. Moreover, this expansion was to be achieved through increased efficiency and without a commensurate increase in resources. The need for greater flexibility in patterns of teaching and learning was, therefore, highlighted, as was the adoption of a more market-oriented system. Greater emphasis was also to be placed on quality assurance to ensure the enhancement of the quality of both teaching and learning. Thus, the ground rules were set out for a model of mass HE.

There has since been fairly widespread discussion and debate about how to cope with expansion on the scale proposed and within the context of an overriding concern to maintain quality. While it was recognized that some efficiency gains, and hence some savings, might be achieved by squeezing more teaching into the working day and by extending the academic year, many vice-chancellors and senior managers realized that traditional patterns of education provision would not enable HE institutions to meet the expansion of student numbers envisaged in the White Paper, while at the same time maintaining academic standards and the quality of the provision. In 1993, there was a reprieve when a halt was called on the rate of expansion; but since then there have been further, significant reductions in the unit of resources. To cope with such unwelcome changes and establish sound, long-term strategies, a fairly fundamental review of existing systems is needed, including a consideration of the possible contribution of more flexible patterns of teaching and learning.

During the 1980s, a degree of awareness about flexible approaches to education was beginning to percolate through HE. This may in part be attributed to the work of the Open University (OU), which employed a number of part-time tutorial and counselling staff from within the ranks of HE lecturers. More recently, a number of institutions became involved in the hundred or more Open Tech projects that were funded by the then Manpower Services Commission. The impact of such developments was, however, fairly limited. For many HE lecturers, it was against the uncertain background of expansion and resource constraints that they first encountered any serious discussion of open learning. It was, therefore, hardly surprising that the initial reaction of many individuals to the idea of exploring alternative approaches to teaching and learning was sometimes less than enthusiastic: many were fearful for their jobs and hence were suspicious of motives.

While on secondment to the Open Learning Foundation as the academic coordinator for Health Services, I ran a series of workshops designed to introduce colleagues to the concept of OL and explore ways of building greater flexibility into existing and new course provision. It was in this context that I initially encountered some of the resistance outlined above. It was also around this time that I began to realize that OL was perhaps being introduced to many HE lecturers in entirely wrong way: as no more than a means of responding to government targets and of solving some of the associated practical problems currently facing HE. As educationalists first and foremost, teachers in HE are understandably and rightly suspicious of any approach which appears to spring from mere expediency rather than from a sound and principled educational foundation. Hence the importance of starting any debate about the possible contribution of OL by exploring some of the educational reasons for adopting alternative approaches to teaching and learning and by considering the possible advantages and disadvantages of particular approaches. Since my work in the OL field has mainly been in this area, whenever the points that are raised apply equally to other subject areas.

Traditionally, the organization of HE has been largely course-based, and as a consequence most educational activities have centred on the course. The past decade, however, has seen the introduction of a number of educational initiatives designed to enhance the accessibility and flexibility of HE, bringing with them a number of significant benefits for both students and employers. The main innovations include the following:

- *Modularization*- students are no longer expected to commit themselves to entire courses that may last several years. Rather, they can enrol on individual modules and can shape their programme by selecting subsequent modules with the benefit of the experience gained.
- *Credit accumuation and transfer scheme (CATS)*—with modularization,it became necessary to develop a system that enabled academic credits to be 'banked' and recognized by other institutions, allowing students to transfer more easily between institutions than had traditionally been the case. Between 1986 and 1991, the Council for National Academic Awards spearheaded the development of CATS, thereby helping to change the culture of HE by enhancing flexible provision and structures. This scheme has now been adopted by many universities.
- *Accreditation of prior learning/prior experiential learning (APL/APEL)* — this increased student mobility between

education institutions through CATS required, in its turn, the establishment of a formal system to assess and accredit prior leaning. Only thus could it be ensured that students received both full, formal academic recognition for previous learning, and appropriate guidance about what modules needed to be successfully completed in order to gain a particular award.

For many students, traditional and methods of teaching raise enormous difficulties. Taken together, the above developments lead to an increase in accessibility an flexibility. They open up HE opportunities to a wider section of society including part-time and mature students, and remove many of the barriers of inflexible structures previously encountered by many students. As a corollary, increasing numbers of institutions are realizing the need to explore new approaches to teaching and learning, and are beginning to explore how OL materials might be incorporated into new and existing modules to enhance the flexibility afforded by modularization, CATS and APL/APEL. It is on OL that I wish to focus in this chapter. From the outset, I would like to stress the importance of looking at both the educational advantages and disadvantages and the need to acknowledge these when considering how OL might best be used within an HE context. If, as suggested above, OL is merely regarded as offering a pragmatic solution for some of the practical difficulties currently facing HE, then it is unlikely ever to be regarded as a mainstream educational activity. By contrast, Thorpe argues that open learning should be viewed as: 'an approach which, rather like the Trojan Horse, has brought back more urgently into the strongholds of institutions of education and training, a set of issues about whom we should be providing for, to what purpose and by what means'. If it is to succeed, OL must be fully integrated into course provision and its contribution needs to be evaluated.

Open learning: its educational philosophy

As we shall see, the educational philosophy behind OL is entirely in accordance with a number of educational practices which many HE lecturers would wish to support. While there are numerous definitions of OL, for the purposes of this chapter, I want to extract six key concepts that are embedded in the philosophy of OL:

- a student-centerd approach
- students encouraged to take responsibility for their learning
- learner's choice
- opening up learning opportunities by overcoming some of the barriers to course attendance
- flexible education provision to meet individual requirements
- the use of specially prepared or adapted learning materials.

The OL approach, therefore, brings together sound educational principles and an organizational framework which is practical and suited to the needs of our times. Its success depends on the provision of effective learning materials which have been specifically designed to enable students to take responsibility for their learning. It is characterized by the flexibility, adaptability and responsiveness of organizational structures and not but the least—by the reduced reliance on teacher availability at specific times and places. In all these respects, OL provides a significant alternative to conventionally taught courses within traditional HE structures.

Within a programme that uses OL materials, there can, of course, be substantial differences in the amount of openness and control offered to students. At one extreme, students may, with guidance, be allowed to make important decisions about many aspects of their learning, including:

- *what to study* - programmes, modules, sequence
- *how to study* - preferred methods of learning, preferred

media, what routes to take

- *where to study* - location(s)
- *when to study* - start/finish dates, pace of learning.

In addition, students may be involved in decisions such as the kind and amount of support needed and might provide it and whether the learning will be assessed and, if it is, how it will be assessed and when.

At the other extreme, lecturers may wish to exert far more control over the learning process, determining what is studied, broadly when it is studied, and how and when learning will be assessed. However, even when such parameters are defined at the outset, the use of learning materials which encourage active learner involvement and which can be studied away from an educational establishment may still allow students greater flexibility and control over learning than is usually possible in conventionally taught courses offered within traditional educational structures. Finally, the middle course between teacher control and student autonomy is readily achieved by the inherent flexibility of an approach in which OL is given a significant role.

At present, despite the success of local schemes, the use of OL still appears to be somewhat marginal. It is largely confined to areas where access to conventional education provision is problematic, or where a student population tends to be scattered over a fairly wide geographical area. In order to examine the case for open/distance learning, it may be helpful to explore some of the potential advantages and disadvantages. To do this, I shall focus on two different perspectives: that of the lecturer and that of the student. As we examine each of these in turn, the following list of key characteristics of education will provide a useful framework to evaluate the possible contributions of OL:

- accessibility;
- availability throughout the lifespan;

- responsiveness to widely differing individual life circumstances;
- ability to cope with learner diversity;
- affordability;
- demonstrable effectiveness.

The lecturer's perspective

From a teacher's perspective, there would appear to be a number of potential advantages in using OL. First, the continuing move for providers of HE to widen access faces teachers with the challenge of meeting the learning needs of increasingly large, heterogeneous groups of students who may also be at different starting points in terms of background knowledge, needs and academic ability. The use of learning materials can help cope with larger student numbers while still maintaining the quality of educational provision. Taking an example from the area of health and nursing, one can look to the uptake of the OU's programme. A Systematic Approach to Nurising Care to see how a set of learning materials written on a core topic has been used on a large scale to meet a particular education need. In just the first four years of its presentation, the OU claimed to have sold over 20,000 copies, and it has been estimated that the actual usage increases this figure by at least a factor of three.

Since teacher contact time tends to be a relatively small proportion of total study hours, the use of OL materials to cover much of the core 'information giving' can free lecturers from that role, enabling them to focus more on facilitating the learning process and providing guidance and support to individual students and small groups of students. In this way, available contact time may be used to ensure that individual learning needs are met, and to focus on learning activities that cannot be achieved by materials-based learning. Indeed, by combining the advantages of materials-based learning and face-to-face contact in mixed-mode modules/programmes, it is possible to capitalize on the advantages of each.

Published learning materials have usually been written by experts in their field, and during the developmental process are reviewed by further subject experts and groups of students who work through the materials, providing detailed feedback regarding their relevance an usefulness from a user's perspective. With such systems in place to ensure quality, a programme that incorporates effective learning materials may offer better experience than an equivalent taught course, particularly when teacher contact hours are limited. For some lecturers, however, the possibility of using learning materials either produced in house or by major producers such as the OU and the National Extension College raises the crucial issue of the 'not invented here syndrome'. To counter this, Stainton Rogers argues that there are some:

> Very good functional reasons for deciding to incorporate materials produced by somebody else into your own teaching. Very often such materials will have been produced by an organisation with access to skilled staff, and considerable resources....for the generation of high quality text, video- and audiotape, computer-aided learning software and so on. .... considerable time and effort has already been expended in their development.

If one is prepared to accept these arguments, the use of such learning materials can save educational institutions' considerable development and course planning time, although any learning materials that are used do, of course, need to be fully and carefully integrated into the overall educational philosophy and structure of the programme in which they are used. Meanwhile, the shift of emphasis for the lecturer from primarily a teaching/lecturing role to one of facilitating learning can be enormously rewarding, reminding one perhaps of halcyon days when considerable periods of time were spent with students on an individual basis or in small groups.

In addition to the use of OL materials to meet the needs of large numbers of students. OL can also enable lecturers to offer options to small groups that might otherwise not be regarded as economically viable when face-to-face teaching costs are calculated.

There is also evidence, which may surprise some educationalists, suggesting that OL materials can provide an effective means of changing attitudes. For those HE lecturers involved in delivering programmes of professional education, this is an important consideration. The benefits of OL do not, therefore, appear to be restricted solely to the cognitive domain. The application of theoretical and conceptual issues to work experiences is also of central importance for teaching groups such as social workers, nurses and midwives, teachers and managers. Lawrence *et al.*, found that through the use of carefully designed activities, OL materials can provide an effective means of helping students to relate theory to practive, thereby bridging the theory-practice gap that dominates much of the literature on professional education.

Perhaps not surprisingly, there are also some potential disadvantages. The cost of the learning materials can be high, whether they are developed in-house or bought in from an external producer. This may require pump-priming funds, or some form of loan, since in HE fees follow student enrolments, and this can make it more difficult to fund any new development that is front-loaded in terms of costs. If money is borrowed to purchase learning materials or to develop them in-house, and has to be repaid from income derived from running the programme, a sound business-planning approach is vital. There may also be additional costs incurred in adapting or augmenting the materials so that they can be used within a particular programme to ensure that learning outcomes are full addressed. An even greater disadvantage in some areas is that suitable learning materials simply do not exist, forcing lecturers to consider whether they should become involved in developing them in-house. With just this reason in mind, the Open Learning Foundation was established in 1990, encouraging its 23 founder members to collaborate in the development of core learning materials that would meet their needs.

The change in role to 'facilitator of learning' may initially seem rather threatening to some lecturers in HE. This feeling is clearly reflected in one of the findings of the survey of OL undertaken by Lawrence *et. al*: 'Teachers frequently expressed the need for training in the use of learning materials and for the development of the facilitator role. There is a sense of anxiety about the loss of control of the learning experience in many of the statements made.....by teachers, which may reflect their uncertainty about their own future roles." Initially, the use of OL may involve a period of considerable uncertainty for some lecturers while they adjust to the shift in emphasis from the role of teacher to that of facilitator of learning and to a perceived loss of control over the learning process. To address this issue, some producers offer their learning materials on a computer disk to enable teachers to select particular sections, adapt the text and add local examples, case material, etc., prior to reproducing the material for use with their own students, the rationale being to increase the sense of ownership. Some teaching staff will, therefore, need additional preparation to develop the skills, attitudes and confidence required to facilitate learning and to encourage students to become more self-directed. They may initially require considerable help and support from more experienced OL tutors. Initial staff development and institutional development needs can incur high start-up costs which need to be regarded as a long-term investment.

Although, in the long run, effective, supported use of OL materials within an educational programme can enable students to become more self-directed, this can take time to develop. Teaching staff must realize that, initially, some students may need considerable time and support during their early exposure to OL until they have developed sufficient confidence to work with reduced teacher input, direction and control, and patterns of independent learning have been established. In addition, lecturers may need to adopt more flexible working hours to meet student' needs, particularly those of students studying part time. To sum up, for lecturers and students alike, the underlying aim and basic principles can be seen to be increased autonomy and self-direction.

The students' perspective

In some respects the student perspective has much in common with that of the tutor who is introducing the principle of self-directed learning: both may have new habits, skills and attitudes to learn! Depending on the openness of the system. OL can allow students to shape their own learning programme by defining their own learning outcomes and working through learning materials at their own pace. The use of individually negotiated learning contracts can help ensure that learning meets the specific needs of individual students, although this is essentially a two-way process. It aims to help students avoid repetitious learning and built on existing knowledge and skills. A further benefit is that the students can study in ways that are best suited to their individual circumstances, and make optimum use of available time to meet their own particular learning needs. As a practical consequence, opportunities may be increased for those who, due to unsocial working hours and personal commitments, might otherwise be unable to attend a more traditional programme. In addition, there is also the important educational gain in the understanding of, and commitment to, the learning process. We have seen that OL offers flexibility and the scope for individuals to study different topics at different depths and different speeds according to specific interests and needs. The use of learning materials can allow learners to exert greater control over the pace, place and time of learning. These benefits are nicely summarized for us by the Open Tech slogan of the mid-1980s: 'OL enables people to learn at the time, place and pace which suits them best.'

Given the stages through which quality learning materials must pass during development, they can offer students, exposure to the ideas and teaching of nationally recognized experts who might not otherwise be available to lecture in their local institutions. The use of good learning materials can help to ensure quality education provision that is not dependent on who is teaching, how the teacher is feeling and other factors that can affect the quality of face-to-face provision, such as unsuitable teaching accommodation and the like. If the quality and suitability of learning materials are carefully evaluated prior to their use, an OL programme can be of a very high quality. Not only may the use of such learning materials raise the morale of hard-pressed lecturers who are committed to the delivery of quality learning opportunities for their students, but they can also help to engage the understanding of students and thus motivate the learner.

Among the advantages perceived by students is also the choice of working either alone or in small groups, depending on preference and on individual learning styles. The use of learning materials need not, therefore, necessarily imply isolation. Moreover, learning materials are always available to the student for reference in a way that a teacher cannot be. As a further benefit, it can be easier to make up for lost study time if a student is absent due to illness or some other reason.

Students can also become more self-directed and begin to acquire the habit of life-long learning that is all-important when working in environments that may constantly be changing. As noted above, it can help to empower students to take charge of their own learning through greater control and ownership of the learning will process. Students who are able to organize and structure their own learning will have developed the key skills of self-motivation, self-discipline and self-management that are now required in so many work contexts.

Turning now to the major potential disadvantages, some students may experience isolation if they are not able to attend regular, scheduled face-to-face sessions during which ideas can be exchanged and the enthusiasms of others shared. Mann `argues that student support by teacher's is the key to motivating students to ensure that they successfully complete a programme of learning. Negotiated access to tutorial support at specified times/places is crucial, as is the installation of direct telephone lines with answer-phones. A student whose interest and motivation may be failing is unlikely to persist in trying to get in touch with his or her tutor if the swichboard is always slow to answer a call, or if an individual is constantly unavilable. Due to the problems associated with isolation, students will often welcome a mixed mode of delivery, whereby OL materials are integrated within a module that includes some scheduled face-to-face sessions that allow students to benefit from the advantages of both modes of delivery. The creation to self-help groups can also provide a valuable source of peer support that can help to reduce the sense of isolation.

Students need to feel a high level of commitment and internal motivation to succeed, since much more is left up to the learner. It has to be acknowledged, therefore, that OL may not suit all individuals at the outset: some students may need considerable support initially before they begin to feel comfortable and confident with a more self-directed mode of learning. This point is reflected in one of the findings reported by Lawrence *et al.* who state that 'not everyone responds to this learning approach, it may be that some degree of preparation is needed to cope successfully with this learning method'. OL producers believe that although not all students respond well at the outset, the vast majority can be helped to understand OL and value a more student centred approach.

Possible benefits for employers

Increasingly, industrial and commercial organizations are looking to OL to help meet the education and training needs of the workforce Those HE teachers who are offering education and training programmes for either the public or private sectors should be aware of the reasons why an increasing number of employers are finding that the use of OL materials can help meet their needs. The potential benefits include:

- a means of relocating some components of education into the workplace
- an educational resource that may be shared by colleagues

in the workplace—such sharing can also encourage the creation of a subculture where continuing education is highly valued

- a means of implementing work-based learning that can help to bridge the gap between theory and practice, since learning occurs while the individual is actually doing his or her job
- access to materials by those, such as mentors and facilitators, responsible for supporting the student in the workplace, which can also assist the provision of more effective learner support than might otherwise be possible for students following a conventional teaching programme, where the mentor/facilitator may have considerably less understanding of course content
- not needing to release staff from the workplace at set times and on set days
- study time that can be programmed more flexibly around the needs of the organization, enabling times of peak workload and staff absences to be more readily accommodated, while meeting individuals' professional development needs
- possible reduction of travel time, travel costs and subsistence costs, although it is important to stress that OL should not be regarded as education/training on the cheap.

A major issue in the minds of any potential user is that of affordability. Cost effectiveness is often assumed to be one of the main benefits of open/distance learning and, indeed, it may turn out to be highly cost effective. At present, however, there is insufficient evidence either to support or to challenge this assumption. It can be difficult to measure in any meaningful way the full costs of providing an OL programme and compare these considerable support while adjusting to a shift in their role from teacher to facilitator of learning, as well as help in encouraging students to become more self-directed. Some may also want to acquire further skills in guidance and counselling in order to provide better student support, and to help students to formulate their own objectives and plan how these might best be met. Some teachers will also need specific preparation on the use of the learning materials, telephone tutorials and the management and administration of an OL system. Thus, a programme of staff development will usually be required to develop a critical mass within the overall population of teaching staff with the necessary attitudes and commitment to implement OL successfully. And, even if there are already significant numbers of teaching staff who are experienced in using OL. They will need time to become thoroughly familiar with the learning materials that form the basis of a specific module or programme. Recognizing this, the OU pays a staff development fee to all tutorial staff who are new to a particular programme to cover the cost of this all important familiarization period.

Once successful OL schemes have been established both within and beyond mainstream undergraduate provision, they can be set up as demonstration projects within an institution, or even within the HE sector as a whole, to help raise the level of awareness among colleagues. The use of demonstration projects, coupled with work-shops and more widespread dissemination of ideas through publications such as the Times Higher Education Supplement and journals such as Open Learning, can go a considerable way to further the debate about the potential value of introducing more flexible patterns of teaching and learning.

Regulation issues

Internal debates may be needed within an institution about the proportion of the total number of study hours that can be dedicated to OL and still contribute towards an award previously based on fixed number of hours of classroom teaching. The concept of minimum course attendance requirements would obviously need to be reassessed. This in turn raises the question of whether it is necessary to specify minimum time periods for the achievement of particular learning outcomes. Some students may be capable of achieving specific learning outcomes in a considerably shorter time than other students and should perhaps be allowed to complete summative assessments whenever they are ready, rather than at fixed points in a module or programme. The emphasis needs, therefore, to be shifted away from specifying numbers of study hours, module/programme duration and/or minimum attendance, and towards the development of more flexible means and timescales for students to demonstrate the achievement of specific learning outcomes at predefined academic levels.

Staffing issues

In some institutions, there may be concerns about how to weigh students who do not attend programmes in a traditional manner. Indeed, OL students may be weighed differenly in statistical returns, making it less beneficial for staff members wishing to incorporate OL materials into their programmes for sound educational reasons. If, under a modular scheme, one student full-time equivalent is regarded as equivalent to a student enrolled on six modules, then one student enrolled on one module equals one-sixth of an FTE. If the same criterion were to apply to OL students, then six OL module registrations would equal one FTE. Thus, OL students can be recognized in the same way as, and given the equivalent weighting to, any other student in the institution.

Student support

Student support is recognized to be crucial to the success of any programme incorporating OL materials. Students need to be provided with clear information about the availability of tutorial support when undertaking any programme of self-directed learning: the use of OL should not be viewed simply as a means of reducing the amount of teacher contact or teaching hours. As already suggested, students should also be encouraged to set up self-help groups or study pairs to help reduce the sense of isolation that some may feel. In the first instance, students may also require special preparation to help them to appreciate and take full advantage of the flexibility afforded by OL and to seek tutorial or peer support when needed.

The provision of adequate administrative support

By comparison, conventional teaching requires relatively little administrative support and, as a consequence, there is a tendency to underestimate the amount of administration time needed to establish and manage an effective OL system, and the cost of providing that support. Administrative support is needed to deal with enquiries, and to ensure the avai lability of learning materials which need to be ordered, checked, logged in, stored and issued. If a loan scheme is in operation for the learning materials, returned items also need to be checked, and non-returned items need to be chased to ensure their availability for future students. The establishment and maintenance of accurate and up-to-date records is also essential, particularly if assessment does not occur at fixed points in the programme or at fixed points in the year, and if a large number of students have enrolled.

A crucial aspect of any OL system is, therefore, an efficient administrative system. In my experience, many course/programme leaders have, at the outset, seriously under-estimated the amount of administration time needed to run a programme involving OL, and this element needs to be adequately costed. As OL operations develop within a school, department or faculty, it may become necessary to appoint an administrator with special responsibility for OL. Moreover, this person may be required to work flexible hours to ensure that adequate administrative support is available to both students and staff during periods when OL students come into the institution.

Course validation

Existing institutional validation procedures may not readily accommodate the special needs of a programme with a substantial OL component, and may need to be adapted. Members of a validation panel for an OL programme must be familiar with the specific issues that would need to be addressed in both the supporting documentation and during the validation event, to ensure that sufficient attention is paid to all aspects to the OL system that could affect the overall quality of the student learning experience. This should include the provision of flexible student support and also adequate administrative support for both students and teachers. Whenever published learning materials are to be used, evidence would be required that a systematic evaluation of the materials has been undertaken to establish their suitability for the proposed use.

In a mixed-mode module/programme, validators must ensure that the various components are well integrated, and that a consistent educational philosophy is maintained throughout and is clearly understood by all members of the course planning team.

Where learning materials are being developed in-house, it should be noted that it would be entirely inappropriate for validators to require to see all the learning materials prior to validating the course. They should, however, reassure themselves that sound procedures have been implemented, by requesting a clear description of the stages of materials development and the steps that have been taken to assure quality, together with a sample of the learning materials that have been developed. Quality control procedures should include:

- evidence of developmental testing
- external reviewing by subject specialists
- the use of OL editors to ensure that effective learning materials are produced.

Following validation, it would be necessary to ensure that the course/programme/module evaluation tool was suitable and catered for specific issues relating to the OL system that could affect the overall quality of the learning experience. If a standardized evaluation tool is in use, a review of the format is likely to be necessary to take account of the key OL issues which can affect the delivery of a quality learning experience for students.

7

Higher Learning and Information Technology

Within this chapter the contribution of information technology towards flexible learning will be interpreted extremely widely. It will include the contribution to distance learning via electronic networks, open learning through student controlled learning pathways, and the process of changing teaching and learning styles by using a narrow range of IT-based facilities which fill a particular need for a particular topic within a particular course. All are valid uses of IT, and IT can also provide a medium for teaching and learning and contribute to flexibility in course provision.

What will be argued is that increasingly students will be ready for such pedagogy when they enter higher education, and that the increased hardware power and networking facilities now make the manipulation of *relevant* information possible at a level which can contribute to flexibility in teaching and learning and enhance the quality of the students' experiences. It will also be argued that it is fallacious to view most IT-based learning as part of a cost-cutting exercise, that administrators and policy makers underrate the problems and time-scale of implementing such changes, and that the 'software power' is not yet at a level which makes the use of IT-based flexible learning an option for many university staff.

There are two strands which need to be considered:

- learning to use IT through flexible learning;
- using IT for flexible learning.

Both aspects have an important and growing role in students' learning.

Learning to use IT through flexible learning

There are already many developments in students learning to use IT through flexible learning. The majority of undergraduates are now able to use word-processors, and a growing number of undergraduate assignments are now in word-processed format. Few of these undergraduates will have been given any formal training with the word-processing packages. Some will use IBM PC and compatible computers, some will use Apple Macintosh, and some will use other hardware bases. The learning has been individual and based on manuals of various types, peer support and the 'ask someone who knows' process. Students now imports pictures drawn by themselves using a self-taught drawing package. Obviously we are dealing with an able section of the population who are capable of fulfilling a need when the need is identified.

Evidence therefore exists from current practice that students in higher education are capable of learning to use IT through flexible learning means if the need is apparent. University computer services departments have supported this mode of learning for many years by providing 'beginners guides' to popular software packages.

Using IT for flexible learning

This mode of using, IT is much more fundamental to the future direction of teaching and learning throughout the education system as a whole. As far back as the 1970s, the predictions of the future role of computers in taking over the job of the teacher were common. Both information technology and the process of teaching and learning involve the storage, retrieval and manipulation of information, so it seems natural that the former can contribute to the latter, especially as more powerful computers are able to handle the type of information relevant to the more general education arena. In 1986, as part of a crystal ball-gazing exercise on the future school curriculum, Saunders felt that 'information technology is revolutionary in that it puts learning into the hands and control of the learner'. It is worth looking at the reality of this vision, and at the contributions towards achieving it throughout the education system. To do this we need to look at:

- the experiences of students prior to higher education;
- developments in information technologies;
- teaching methodology and students' learning;
- costs and cost-effectiveness.

The experiences of students prior to higher education

There is little doubt that information technology is of growing importance within the 5-18 education sector. Throughout Britain there is an entitlement to IT for all pupils in the 5-16 range due to the National Curriculum. It is expected that the programmes of study and attainment targets, which are specifically defined, should be delivered and tested within the context of a wide range of subjects. The use of IT, however, precedes the National Curriculum and its power to contribute to enhanced learning has been identified by Her Majesty's Inspectorate based on evidence of their own surveys. In 1989 they stated that:

> The nature and balance of much work within the curriculum are likely to be radically changed ... Compared with current practice there is likely to be an increasing emphasis on the quality of communication; and greater stress on high-level thinking, on interpretation and on creative expression. Especially in the later key stages, the use of technology to measure, to collate and to display the results of experiments or investigations allows increased time for, and emphasis on, analysis and interpretation. More is likely to be expected of pupils in terms of creative expression and

conceptual understanding because of the reduced need to engage in or master routine techniques.

In a later report, based on observations of 1,300 lessons over the period 1988-92, HMI made further comments on the benefits of IT to the process of learning. They reported observing positive contributions to the learning process in the 5-18 age range in most areas of the curriculum.

There are many more developments in IT within this age range which will contribute to the readiness of higher education students to use IT supported flexible learning. The government-funded CD ROM in Schools Scheme has given a high profile to this technology as a support to more flexible learning styles. A recent survey of all secondary schools in three East Midlands local education authorities showed that 81 per cent have at least one CD-ROM system, usually based in the library resource area, and 95 per cent of these have a CD-ROM based encyclopaedia. If pupils are to use such resources effectively then they will need to be trained in enhanced information retrieval and schools are starting to put such training in place. There is a growing number of reports of networked CD-ROM systems throughout schools to further encourage pupils and teachers towards more flexible approaches to the flow of information for learning.

In some schools CD-ROM is becoming part of the much wider multimedia environment. Project Horizon for example, taking place in Hampshire in both primary and secondary phases, has involved a wide range of media linked via information technology. It has been found of pupils in one middle school that over a period of five weeks, their search and IT skills improved dramatically and they learned how to communicate and present information in a much more articulate way.

The National Council for Educational Technology (NCET) has recently been gathering together the wide-ranging evidence of the benefits of IT to learning. Some identified benefits are:

- IT enables greater imaginative understanding through increased access to information and new ways of accessing and communicating information;
- IT provides new forms and structures for representing knowledge which will as language does, affect that knowledge and the individuals relationship with it;
- IT enables users to ask 'What it ..?' it gives the individual the power to take risks and make mistakes that would otherwise be costly in terms of time and/or materials;
- IT increases the opportunity for interpretation and application of data by making redundant the need for learners to process the data themselves;
- IT changes the nature of composition and authorship because the forms of compositon are more numerous than they have been and because of the facility to combine original and they have been and because of the facility to combine original and second hand material and integrate different media;
- The use of IT provides opportunities to develop clear logical thinking, sequential understanding and study skills;
- IT enables the recording process to take place while it is being used, thus enhancing the learner's capacity to reflect upon, and the teacher's opportunity to intervene in, the learning.

Such perceptions and observations of the role of IT in learning, by HMI, NCET and many university-based researchers, are eminently transferable to the higher education sector, especially if we take on board an understanding of learning theory at the same time as developing IT-supported learning. Equally important, the IT experiences of the students which we will be recruiting in the near future will ensure the ability to capitalize on any expansion of teaching and learning supported by information technology. Such capitalization on students' innate ability to use IT could help to ensure that the quality in teaching and learning envisaged by the Higher Education Quality Council is realized. This is summarized in a paragraph from their checklist:

> Institutions will wish to consider how different teaching strategies bring about their intended student learning objectives and enable students to take maximum responsibility for their own learning.

No one would claim that all students will have experienced all aspects of IT use, but a basic competence will be available to build upon. The more mature returnee to education is also more likely to be IT-aware and competent than in the past due to their experience in commerce and industry.

Developments in information technologies

The developments in schools have been possible because of the increased power of the technology available to them. In the higher education sector, they have been many developments reported by the Computers in Teaching Initiative. CTI was established in 1986 to:

- encourage the development of computer-assisted teaching and learning in UK universities;
- evaluate the educational potential of information technology at UK universities;
- promote an awareness of the potential of information technology among lecturers and students in all disciplines.

It is not possible to record here all that has been done and reported, and interested readers should refer to the CTI Support Services (CTISS) publications which should be found in all universities libraries and many individual departments. These publications are a genuine resource for the enthusiastic, not so enthusiastic and even the cynical on up-to-date and relevant developments in the possible use of IT in teaching and learning in higher education.

The 'possible' is perhaps connected with the 'cynical' in that CTI pilot projects will, on the whole, be set up and run by enthusiasts, with enough funding to support the development of an idea which fits their interests. The results and progress are well reported and no doubt some readers will pick up ideas which prevent them from having to reinvent the basics; but such readers do not have the funding to support the development of the work. The other possibility is that the projects have been designed to produce totally transferable ideas and materials, which can be implemented at any other institution at no cost. A reasonable assumption is that the real situation is going to be somewhere between the two extremes.

The CTISS files provide some indication of how the hardware and software technology is influencing the potential use of IT in supporting more flexible learning styles. Garrett reported that the processing power increased 20-fold between 1986 and 1991, and that improving network technology will allow cross-linking of different makes and types of computers. The transferability of images and moving video will be possible and better user interfaces will allow more flexible use of software through the ability to switch in and out of various tasks easily and rapidly.

In the same CTISS file, Hamilton reports on the development of the Joint Academic Network (JANET) into Super JANET. This will be the backbone of increased flexibility in national and international communications, allowing students greater access to a wider range of information sources in a range of formats, such as text, images and video. There is also the potential to link into the cable television infrastructure which uses optical-fibre technology like SuperJANET, providing such communication facilities directly to the homes of both students and academics. So where will the tutor have to be to lead a tutorial.

In a similar way to the CTI projects, the Teaching and Learning Technology Programme in higher education is also widening our knowledge of the use of IT. The projects have not been going for as long but the educational variety and technological range will contribute widely to our basic knowledge of how IT can support learning. Some of these projects are based around videodisc technology, which is the 30cm version of the CD ROM technology, providing a very flexible learning resource. In addition, the disc can be controlled by a bar-code system which means that the user interface becomes more traditionally based around worksheets. Another advantage over CD-ROM is the greater range of data which can be stored, with 55,000 still screens of images or text or about 30 minutes of moving video, or any combination of these. Projects as diverse as experimental techniques in chemistry for undergraduates to classroom management and control for teacher training are in progress.

Software developments will always lag behind hardware and this causes a problem in developing new systems of learning. The improved user interfaces will provide improved access to the technology for academics. However, if flexibility rather than constraint is inherent in the learning pathways, then the complexity of computer programming can be immense. Newer authoring programmes are certainly improving access, but users still require a 'considerable time and effort to acquaint themselves with the more complex aspects of the package'. A lot of this software is used in industry for training purposes - but this encroaches on the perennial discussion on training and education. Most authoring packages were designed for industry where they are used in narrowly defined tasks. This provides flexibility of access, but constraints the learning, and in that way cannot really be considered to have a realistic future in higher education. Of course, the increased power of the hardware will eventually provide a base for very sophisticated software and the CTI programme is a good source of ongoing information.

Teaching methodology and student's learning

So students have, to a growing extent, the background knowledge from previous work with IT. The students already show that they are able to learn relevant skills through their own learning pathways and the higher education system already has access to an ever improving technology to support more flexible learning styles. Why has the higher education system been show in changing?

Thinking about the use of information technology in education should not primarily be about the technology, it is about the relevant flow of information. If the flow of information is too constrained then the learning experience will be a poor second to the more conventional learning methodology. We have to be sure that the technology can do what we are asking of it. To do all this we have to think about our pedagogy as a whole; the total art and practice of teaching needs to come under scrutiny. The end of the last section highlighted the major problems in this area. We noted the lack of suitable software based on good teaching methodology which can at least equal a tutor's natural flexibility so that the resulting educational experience is not second best and painful to our professional integrity.

There is, however, much interest in developing the use of IT, which can be summarized by quoting the introduction to a paper on Authoring and Authoring systems:

Perhaps we exaggerate about the current level of interest in computer based teaching and learning (CBT/L) in higher education, but our real point is that we are on the verge of a major upsurge in CBT/L materials development and an increasing number of our colleagues are beginning to search around for guidance and leadership as they take their first steps in the process. Reacting to the twin imperatives of falling staffs and ever-increasing student numbers we are all finding CBT/L is fast becoming an attractive option. Obviously there are other reasons for the likely increase in CBT/L development, not least the enhancement and extension of student learning, but let us stick for the moment with the need to free up staff time from the more humdrum and repetitive aspects of their teaching activities. If the students can study at their own pace in front of a computer, and perhaps in their own time, then the lecturers will be that little bit more able to provide prime-time contact in addition to being able to engage in research.

Similar sentiments are reported by others working in this field, such as, 'this series of independent study materials reduces the need for whole group teaching, releasing staff for tutorial or other work'.

It is going to be necessary to look at some models of flexible learning and models of CBT/L and try to match the two together into the an educationally sound approach. Immediately we have the problem of which aspect of flexible learning and which definition of flexible learning is to be addressed. It will be useful to work on the basis that the computer will, to a large extent, be helping to manage the flow of information in response to students' needs, in which case the pedagogical issue becomes one of managing learning'. Earlier work in this area by the Technical and vocational Education Initiative has already developed a flexible learning framework which is described as 'a strategy to help teachers manage effective learning'. This splits the process up into three inter-linked 'managing' modes. Under each of these modes are specified the aims of the teacher and outcomes for the student. It is possible to match these to what we now know about the developing information technologies.

In managing student/teacher partnerships, IT could be used for the mutual benefit of both parties. There is no doubt that much of this is best done by taking together, as only in this way can students and teachers get to know each other to enable the rapport normally associated with good teaching. There are, however, ways of enhancing communications to the benefit of both. The use of electronic mail systems means that students can be sure of getting questions to a tutor and the tutor can manage his/her time in handling student questions, rather than having to cope with the continual stream of interruptions when trying to concentrate on other work. This also allows student queries to be answered remotely, from home for example through the use of models. In this way, much of the communications between student and tutor could be at least maintained, and perhaps enhanced, without necessarily impinging on more tutor time when faced with a deteriorating staff/student ratio. If the student query needs a face-to-face discussion, then a time can be arranged via e-mail when the tutor will be available. This does, of course, assume that the tutor is able to manage the e-mail system effectively and efficiently, with a certain amount of self-discipline. It is now possible to send and receive complete documents via e-mail, and as this technology spreads, the handling in of assignments on paper might have to be reviewed, especially within the distance learning mode of flexible learning. The present technology already provides facilities for tutor-student conferencing, and the growing network infrastructure will add video to such systems.

Information technology is well suited to managing student use of resources. A look through the aims of the teacher and the outcomes for the student shows many areas of match to the current and developing technologies outlined above. It is all about finding, using, manipulating and managing information and information sources. New forms of interpersonal skills will need to be developed to use electronic communication systems to exchange information.

Managing student learning pathways is largely associated with the individualized mode of flexible learning, and again this could be considerably extended and enhanced through IT-supported systems. Indeed, IT could now contribute to all the statements under aims and outcomes as listed in TVEI, and greater online access to the newer technologies will enable this to develop. Even working in teams and small groups can be supported by the presently available software and e-mail systems. The record of achievement and portfolio of work could be continually built up throughout the students' studies, and when the student is ready, the tutor is given access to the work for summative accreditation.

Costs and cost-effectiveness

A report by the Universities Funding Council Information Systems Committee Courseware Development Working Party stated in 1992 that, the scale of investment required is such that until a clear and enduring strategy has been agreed, most HEIs will be reluctant to embark upon the massive infrastructure investment and major structural changes that are required to make the transition that programmes like Teaching and Learning Technology are trying to bring about. This same report also found that 70 per cent of academics would be interested in using computer-based teaching programs and that they identified advantages such as:

- dynamic visual presentation;
- provision for rehearsal of basic skills;
- improvement of learning and understanding;
- access to data and information sources;
- saving of staff tutorial time.

There is no doubt that the costs will be high if we are to achieve the educational and time gains which are possible. A quick glance through the Phase 2 TLTP projects indicates the amount of money needed for developments in very limited parts of courses. First year costs of £250,000 for core history resources, 80,000 for a few video optical discs of images for teacher training, £135,000 for computer-aided teaching about concrete and £230,00 for the development of human-tutor emulation software for teaching introductory financial and management accounting, are typical. Most of these costs are based on existing hardware, and many are only adapting existing software packages rather than producing a completely new package. This means that real costs of developing IT-based courseware will be much higher than these figures might suggest.

It is difficult to find a measure of cost-effectiveness from present projects because they are a combination of research and development. While this is the case, and academics can write up the work as research papers, the enthusiasm is high. The rest of the academic community within HE will be asked to spend this time later on, probably without the funding now available, developing computer-based materials. The overall balance between research and teaching would come under great pressure if the time investment were not properly financed and recognized.

Experience from developing flexible learning materials suggests that producing one 'student hour' of material takes 10 hours for audio, 50-100 hours for written and 300 + hours for video materials. For IT-based flexible learning we would need to add to this the capital investment in providing enough workstations and replacement hardware, network infrastructure costs, and the costs of updating courseware to match updated hardware about every four years.

8

Design and Impact of Higher Education Management

The use of computers for administrative and management purposes in schools is new, as well as for schools as for those who study the functioning of educational institutions. For this reason the Department of Education of the University of Twente carried out some exploratory studies in this area. The general impression after these studies is that schools are very eager to utilize the computer as management tool, but that they are in want of information about the possibilities and of professional school information systems. The computer is used only very partially and limited. If one compares the profit-sector in this sense with schools, one has to conclude that schools are far behind.

For this reason the Department of Education, the Department of Computer Science of the University of Twente and the Centre for Education and Information technology joined hands in the SCHOLIS project. Because of the complexity of the Dutch educational system we had to choose for certain schools. We chose for the AVO/VWO-schools, respectively secondary modern schools and preparatory schools.

The SCHOLIS-goals

With the development of SCHOLIS we are trying to realize the following targets:

a. the development of a future school information system, which gives all the possible and meaningful support to as well administrative as management activities in schools and have a long life-cycle;

b. the integration of all the different subsystems in one total school information system, in order to be able to use the data once entered within all the subsystems;

c. the creation of a system that is at the same time usable and accessible for every staff and administrative employee within the school and for different activities;

d. the possibility for each school to get the information system that suits to the specific situation and wishes of that school;

e. the design and development of a system with a high acceptation probability.

Richard Nolan has developed a theory concerning the growth stages that each organization will have to go through, when it is automating its data processing. Zisman has translated this theory to office automation, an area that has many resemblances with the school context.

On the basis of their work and our explorations in school we assume the following relation between time and the degree of automation in schools :

Our opinion is that most of the educational institutions are in the initiation stage or expansion stage. Schools have started with the isolated automation of one or a few administrative activities in the initiation stage. In the expansion-stage the automation-need grows and more and more computer applications for labour-intensive activities are realized. In these two stages isolated, separated applications are developed. The systems in these stages have been developed by enthusiastic teachers and - especially in the expansion stage - by software houses. The goal in these stages is to improve the efficiency of clerical activities : all kinds of texts and lists that in former days had to be made manually are now produced by the computer.

Administrative automation is what schools are working at during these stages.

When the automation of administrative activities has made good progress, school management will start to pay attention to the possible support they can get from the computer. In the integration stage their attention shifts from the management of computerization to the management of the information household. Managers are then in want of information systems that support their planning, decision making- and control-functions, for instance:

- the support of the construction of examination- and school timetables, the allocation of teachers to classes, the analysis of school and teachers' achievements.
- answers to all kinds of management questions that are relevant for the policy-making process,
- the recognition of events within the school that need the attention of school management.
- the assessment of the effect of a certain policy.

The existence of Relational Database Management Systems and Local Area Networks makes new forms of computer utilization possible. The school manager can ask the questions he is interested in to the database and all employees can use the same database for their own purposes. The highest degree of computer usage is formed by expert systems/ artificial intelligence; these computer applications could become the management tools of the future.

Automation and data processing are approached in the third stage completely different from the way this was done in the earlier stages. Information is seen now as an important tool for the functioning of school organizations and people realize that a good information household requires money. Automation takes place on the basis of a more holistic approach: people are working on the integration of all the different kinds of administrative and management support that the computer can give to schools, in one system. This means that to be able to realize this one should have a very detailed picture of the procedures and activities that take place in a school and of the possible support of the computer.

In the stabilization-stage the organization assimilates the information technology and the maintenance of the systems is central.

Our opinion is that neither schools, nor software houses will bring the integration stage and stabilization stage nearer. The former are lacking of the know-how, tools and money to develop this kind of information systems and for the latter it is too risky to realize an infrastructure that makes it possible to develop these systems. In the SCHOLIS-project we combine know-how in relation to educational organizations with expertise in the field of computer science. To bring the third stage closer, a detailed analysis of schools should be made. This analysis should give an answer to the question 'What information is desirable for the optimal functioning and the management of schools?'. So, one is not only considering the already existing activities in schools and not only efficiency, but especially school affectivity is the criteria for automation.

It is clear that the creation of an information system that satisfies these wishes requires a detailed and fundamental analysis of the total school: what activities are taking place, how are they related to each other, what kind of information is relevant for these activities and to what extent can the computer support these activities?

Such an analysis must lead to a common information system framework in which the sub-systems of the information system are described, just as the functions of the computer within each sub-system. We expect that a thorough analysis of schools will assure a long life-cycle of the developed systems. The framework consists of many modular subsystems, which will make it easier to adapt the system to future developments.

The above mentioned fundamental analysis should lead to a clear insight into what data are used in which way in all the different school organizational processes. This makes it possible to enter these data only once in a central database and to use them in all the developed software.

In the schools of the future there will be an octopus-like hardware structure with tentacles that are strategically distributed throughout the school. The tentacles are connected with a central data base. The advantage is that every administrative and staff employee in the school always works with the up to date data that he/she needs for her/his functioning In our system, terminals should be able to operate individually and simultaneously without conflict or interference.

'The' school organization does not exist. Research shows us that schools differ. Every educational organization has its own organizational characteristics, also in respect to the information household. This means that schools will make different demands upon information systems and will react in different ways to a certain system. The problem of the current software for schools is that it is written in third generation programming languages. Because these languages are very inflexible it is very hard and expensive to change the software and make it fit to the specific demands of a school.

Within our project we are analyzing different types of schools to take these differences into account in our framework. We also are using so called fourth generation languages which make it easy to change the developed software. We are working on the development of a common framework that has sufficient flexibility to permit a school to impose its own identity. On the other hand the system should have enough commonality to be developed and maintained on a central level.

Too many automation projects have led to systems that were not used. Mumford and others have shown us that a working-method in which the automation experts autonomously determine how the system will look like, leads to systems with a low acceptation probability. Therefore, we are working on a participation basis, the interaction and cooperation with the end-user is strong.

The people in the school have several occasions to react on the proposals of the SCHOLIS-members and to suggest changes. The optimal functioning of the school is our goal and in close interaction with those who have to work with the system, we try to realize a system that leads to better functioning schools and that is used as intended.

The SCHOLIS design strategy

In this section two major topics are discussed, namely :

The steps in the development process,
The analysis output.

The steps in the development process

The SCHOLIS philosophy complies the development of an information system framework that enables the realization of an integrated information system in the long run. The specification of such a framework gives the possibility to realize subsystems of the school information system separately without the danger of building partial IS's that cannot be integrated suitable later on.

The ISFW specifies the architecture in which all the subsystems and their functions are defined. In doing this, all the demands these parts lie upon the system as a whole, especially upon the contents of the integrated database, are identified.

Making such a framework requires a fundamental analysis of the information needs and usage within all the activities in a school system. However, there is a great chance of loosing the right orientation to the essentials and to maintain overview because of an overload of details resulting from analyzing.

For this reason we tried to maintain control over analysis by building so called 'reference models' of the primary activities within the school system, before actually starting the analysis.

The design of reference models

Reference models are preliminary, conceptual and hypothetical pictures of the expected situations.

They were meant to give direction to the analysis process in that way that the interviews were based strongly on the models. In the interviews a lot of questions were asked to validate the expected contents of and relationships between the activities in the school organization.

The reference models were developed on the basis of an in house and mainly theoretical elaboration of the expected information relationships between the activities in the school organization. At that moment, our knowledge of the processes in schools was only very modest. In fact, we considered the school as a business organization and modelled it analog to the principles that can be found there.

The reference models were far from complete and often inadequate to describe reality, but they proved to be excellent guidances for putting the right questions, differentiating between really important things and minor affairs and identifying specific characteristics of the activities. In fact they made the contact between user and analyzer efficient and effective. The use of reference models proved to be an excellent way to bridge the communication gap between analysts and users.

Interviewing and document analysis

The fact finding was based on interviews. We started at each school with a discussion of the goals and problems. This gave us the opportunity to introduce the project and the planned way to perform the analysis, and, at the same time, to perform an inventory of the main goals and problem structures within the educational system. After selecting the informants, a period of interviewing started.

The real experts on the activities, the employees themselves, were interviewed and the interviewers examined if the submitted facts were in correspondence with the reference model. If reality turned out to be different, they asked at the same time for the reasons why existing procedures were as they turned out to be, and if other ways of organizing processes were practiced in the past. For about 80 interviews were completed. All the important documents were classified and described in a document dictionary.

Decomposition of each school into elementary procedures

The facts derived from the interviews were used to make a decomposition of each school into 'elementary activities.'

Elementary activities are organizational processes that cannot be broken down into independent parts. They consist of actions that form a functional unit. Elementary activities can be recognized by the fact that the process should take place uninterruptedly. Before starting an elementary activity, the authorized person assures himself of all the information needed, so that the completion of the task is not anymore dependent on results of other processes that are in an unknown state of completion to him.

The analyzing of the interview results lead to a very compact specification of the elementary activities, describing the processes the informant was involved in.

For each of the three schools we made a description of the elementary activities with regard to :

- the admission of new students,
- the administrative transaction of student leaves,
- the clustering of students in classes,
- the coaching of students,
- the identification of marks, the production of school reports and the supporting and registration of the end of year decisions,
- the organization and registration of the results of school tests and the final exams,
- the construction of the school schedules, the financial planning and administration,

- the capacity planning and resource management,
- the acquisition of personnel, the registration of personnel data, skills and qualifications, payroll and other personnel related processes,
- curriculum development and the selection of educational methods and tools.

After each school was described in terms of elementary activities, feedback to the schools was given. The persons that were interviewed were asked to give a reaction on our models of the school processes he/she was involved in. Especially, they were asked to look for omissions in the elementary activities, to verify the descriptions.

The definition of a 'generalized' school model

After the activity models of the three schools were completed on the basis of the feedback response, we derived from these three models a general description of the Dutch school for AVO/VWO.

In this model was indicated which elementary activities were part of the so called man-computer system. An elementary activity is classified as a man-computer system component if that activity can be supported effectively by computer based data processing and/or information retrieval.

The integration of the three school descriptions into one model was a very difficult exercise, because each school imposed its own demands. Furthermore the aim was not to copy the existing situation or to make a model containing only the commonalities. The activity structure had to be directed to the possibilities of modern information technology.

However, the decompositions made were of great use to us and ultimately a strongly satisfying generalized model of the activity structure was realized.

The generalized model of the activity structure was then presented to a selected evaluation board of each of the schools. The aim was to make sure that each school could approve the model as adequate for their school. Moreover, in the case of alternatives the pro's and contra's were discussed and a choice was made. In discussing the feasibility of our ideas, a lot of additional information was given by the members of the evaluation boards.

The discussions the generalized model evoked were very interesting, because the model proposed ways of performing tasks that were sometimes new for the schools. The final 'general activity model' has been developed in an iteractive process of optimization.

Not only a model of the activities and their interrelationships was elaborated. The generalized model of the school contained also a model of all the 'real world objects' that should be represented within the IS. In fact, the school system model contains a number of submodels, each of them defining a specific class of demands regarding the IS to be built. Because these submodels are discussed in the next section, the remaining steps in the development process are discussed first.

The design of the architecture of the IS

In this step the conceptual architecture of the IS to be build was modelled.

Firstly, within each elementary activity possible computer procedures were isolated. This means that specific interactions with the IS were decomposed into information system procedures that could be allocated to either the computer system or to the manual information system.

Secondly, the conceptual data structure model was designed. This means that all the entity types needed to represent the objects within the IS, their attributes and the relationships between the entity types were specified in full detail. After having obtained a good perception of the possible functions of the automated component of the IS, the contents of the data base was specified.

Finally, the subsystems of the automated component of the IS were described in terms of:

- output functions, and
- input functions.

These functions were described in user terms. For example, the output functions were described in terms of the outputs to produce and the input functions in terms of data sets to enter and controls to perform.

The next step performed within the SCHOLIS design concerns :

The prototyping of the IS-subsystems

This step can be subdivided into the derivation of the prototyping model, the building of the prototype, the prototyping itself and the testing of the prototypes in an operational user environment. In the first place however, the SCHOLIS data base was built up. This was done because we wanted to realize prototypes directly working on the data base that would be suitable to serve all the automated data processing.

By doing so, the prototypes itself validated the proposed contents of that data base. The data base could incrementally grow using the experience from the prototyping process.

Because of the fact that working with three different prototypes on the three schools is impractical, it was decided to start with prototyping on just one school and after reaching a more stable prototype there, to analyze the suitability and implementability of the proposed system in the other two schools that also had been involved in the analysis.

After the building up of the data base, a prototyping plan was agreed upon. The prototyping was planned to be performed for individual subsystems of the automated component of the IS, starting with the subsystems of the 'integrated student registration system'.

After having prototyped the subsystems to make sure that the IS-model did have the desired functionality and that the contents of the man-computer interface was effective and efficient, the functional specifications of the endsystems to be built were derived.

At this moment, the SCHOLIS team is working on the realization of the prototypes and the prototyping at the schools. Each time a stable prototype is reached the functional specifications of the endsystem to be built are worked out.

Our goal is to keep these functional specifications 'free of implementation considerations'.

This means that these designs are completely independent of specific computer technology, specific programming languages and/or of specific data base management software. On the other hand detailed descriptions of the interactive functions have to be realized.

After completing the design of the detailed functional specifications the realization of the endsystems of the SCHOLIS system can take place. This is also a process that can take place for each IS-subsystem separately. At this moment we are searching for a good commercial software house to realize the commercial products. Because the realization, distribution and implementation of the software products in the schools is not a part of the SCHOLIS project itself, this step is not discussed here further.

A step that has been embodied in the project from the very start is :

The evaluation of the realized system

One of the main goals of the SCHOLIS project is to develop a framework to study the effects of computerized information systems within school organizations. On the one hand this study should reveal if the expected contributions of

IS's to the effectiveness and efficiency of the school are realized in practice. On the other hand the study tries to summarize the conditions that are needed to avoid all kinds of problems of introducing distributed IS's within the school organization.

The analysis output

The aim of this section is to give the reader some understanding of the specifications conceived in the school organization model. As told before, this model is the basis to derive an architectural model of the information system to realize. It can be seen as the end-product of the analysis of the school organization, necessary to design a suitable information system.

Such an analysis should lead to knowledge about the phenomena, problems, demands and constraints characterizing the real organizational system. Analyzing complex systems leads to voluminous files with descriptions of the designers' perceptions of the reality and of the perceptions of demands and activities given by the users. In order to deduce from this large amount of factual information desired structures, one should be able to translate the consequences of the facts to aspects of the IS to be built.

In this domain, formal descriptions using formal techniques are extremely useful. The following specifications made in this project, can be distinguished:

The goal structure

The analysis relating to this aspect resulted in a specification of the needs of change with regard to the IS, *e.g.,*:

- a more efficient processing of application forms;
- a more reliable basis for planning data;
- better possibilities to integrate data on student results, student characteristics, absenteeism, etc;
- more effective and efficient ways to produce overviews and forecasts, etc.

A good perception of which goals are relevant within the school, how you can measure effectiveness and what the real problems are is a necessity. One should know what the real problems and needs are to give direction to the process of finding proper information system alternatives and to evaluate the usefulness of proposed structures.

The environmental interactions

In this specification the school is depicted as a 'black box' and all the interactions with active environmental entities are depicted. Moreover, the characteristics of this interactions are described.

In the picture above is indicated by what informational and/or physical flows the system is connected to its environment. In fact, these interactions define the boundaries of the system. The IS is not only supposed to register the internal status, but also to register the interactions or even to support the interactions by generating documents, or to transfer data.

The functional decomposition of the school organization

This specification depicts the organizational system as composed of activity subsystems that are relatively independent of each other. In turn, these subsystems are depicted as composed of interrelated subsubsystems, and so on.

An example of the hierarchical decomposition in activities is given in the diagram.

Every subsystem is divided into constituent activities, till the level of elementary activities is reached. For example, the strategical and tactical planning is decomposed into forecasting, goal-evaluation and long term planning. The latter is decomposed into forecasting student population and needed lessons, the forecasting of establishment and personnel fluctuations and the forecasting of the facilities needed. Each of these 'component activities' can be broken down further.

Personnel management consists of the personnel recruitment, the allocation of persons to classes and tasks, the counselling and evaluation, the registration of attendance, the provision of specific services, and the settlement of termination of employment.

To give an impression of the total complexity of the activity structure:

- the 'control of students' life cycle' is one subsystem out of twelve;
- this subsystem contains seven subsubsystems;
- the school test/final examination consists of 56 elementary activities in the generalized school activity structure model;
- only in the latter subsystem, there are already 39 functions of the automated component of the IS identified: 14 input functions, 6 office automation functions and 19 output functions for routine information requirements.

The object structure

In this specification the demands regarding the representation of the objects in reality within the school organization, are depicted. To represent, for example, students in the IS, it is necessary to define an object type 'student'. Because objects in reality do have physical and/or abstract characteristics and also because connections between objects are important facts, the object structure needs not only to represent object types, but also 'associations' with characteristics and associations between the objects.

One can see that a very simple diagram can contain very much information about the system that is described.

Each object type can be characterized by a 'life cycle', *e.g.*, for the object 'student':

- Applies for a specific school year;

- undergoes a school entrance exams;
- is accepted;
- is allocated to specific clusters;
- chooses his subject package, etc.;
- is absent from school;
- becomes a school board/club member;
- goes up and/or stays down;
- obtains results on papers, preliminary exams, school tests and subsequent notes;
- etc;
- leaves the school;

One has to decide

- which events in the school life of students are necessary and/or economically feasible to register in the IS;
- what the key attributes about the events are to register and;
- how the event can be detected.

Here again, important demands to the IS are specified by modelling the basis characteristics of aspects of the educational system.

The process control structures

In these specifications the process rules are defined. The analysis leading to the specifications of the process control is called the control analysis.

However, when control is becoming more complex, the control structures can be specified using the 'systems control model'.

An example of the use of this analysis model is given with regard to the realization of budgets and the control of ordering equipment by the sections:

Such a detailed description is needed to obtain a good perception of the informational interdependencies. The relationships incorporated in this description should be realized by means of information distribution and for this reason they are objects of design.

The system dynamics

In every system processes are taking place that change the state vectors of objects These processes are triggered by events.

It is very important to build up knowledge about what sequence of physical, administrative, and decision making transactions is needed as reaction on the occurrence of a specific kind of event. Also the allowed delay between the happening and/or detection of an event in reality and the realization of the registration/processing are important. In fact, a dynamic model of the interrelationships between events, transactions, activities and objects has to be made that specifies the actions needed to react properly on events. Within that model allowed sequences of registrations are indicated.

Allocation aspects

Elementary activities can be allocated to personal functions, to specific departments, to specific computer sites, etc.

The allocation to specific organizational groups or positions is in fact the definition of the authorization. For example, in most schools only the 'year supervisor' has been authorized to change examination results based on formal decisions made in a meeting of the examination board. In the specification of the allocation aspects all kinds of allocation decisions related to the degree of centralization/ decentralization can be specified.

Realization aspects

These specifications contain all kinds of organizational constraints imposed on the solutions to be found. These constraints can be defined in terms of time and/ or money, in freedom degrees the designer has, etc. These constraints can have their impact on the boundaries and features of the new system. Also desired preconditions for a successful implementation of the system can be specified here, as well as the desired management reports that are to be presented during the development process.

By realizing these 'aspect models' a complete description of the requirements the real school system lies upon the information system is made. It is very important to model the real school system with regard to the aspects mentioned, because otherwise there is a big chance the IS does not really match the environment which it should serve. In the past, a lot of IS's are built using a strategy in which the future users were asked only what the output of the IS should be. This resulted in IS's that were only capable to fulfil the needs that were identified at the moment of the analysis.

Furthermore, not a new school organization directed to the effective and efficient use of modern information technology was realized, but isolated time consuming administrative tasks were supported.

In our approach the IS is seen as a picture of the reality. Not the computerization of the existing system is aimed at, but the IS should steer the event processing, should be an integrated part of the activities, and should contain a data model that supports all kinds of (future) information requirements. The latter is realized by building a data base that is meant to describe all the relevant entities with all their attributes and relationships; this instead of current approaches where the data base is most of the time directly derived from the structures required by the outputs identified in the information analysis.

The components of the automated part of the SCHOLIS

The basic component of SCHOLIS is the integrated data base. This data base contains descriptions of all the relevant entities, such as students, the school organization, the external relations, the curriculum, the teachers, the marks of students, their choices, their school career, the school schedules, etc. All the functional subsystems have been interfaced with this data base. The functional subsystems can be divided into:

- basic registration subsystems; and
- management supporting subsystems.

The basic registration subsystems support the administrative functions with regard to the financial accounting, the student live time, the employees, the subjects, the school schedule, the inventories and the books, etc. used for the subjects. Their primary tasks are the updating of the data base and the production of operational information to be distributed to the participants of the school.

The management support subsystems are supporting the strategy making, the planning, the control and the evaluation tasks of the management. In strategy making, the forecasting of effects of external developments are important. For this sake, spreadsheet programs will be realized to examine consequences of a declining student influx, narrowed norms regarding the student-staff ratio's, decreasing incoming funds, expected difficulties in acquiring specific kinds of teaching skills, etc. In the area of planning, the preparation of next year courses is the primary subsystem. Here, prognostics about the in- and outflow of each year is relevant, the forecasting of choice-profiles to be expected, an interface to a schedule program, etc. To support control, all kinds of exception reporting will be ensured, for example with regard to subject/teacher combinations, truancy, budget exhausting, etc. In the field of evaluation, producing all kinds of statistical reports that enable the comparison with the results of the last five years will be realized. In fact all the information necessary to produce a social, a financial and an operational evaluation report on the past school year can be produced automatically.

The data base of SCHOLIS is a relational data base. This means that users can give all kinds of *ad hoc* queries to the system in a query language that resembles natural language in such a great way that it is easy to learn for the non professional users. For example if one wants to see the schedule of a specific class on a specific day, the query is:

```
SELECT day, hour, class code, subject, teacher, location

FROM class schedule

WHERE class code - '2M2' and day - 'TU'.
```

In the queries, all kinds of data can be related to each other, *e.g.*, data on students' truancy, students notes, allocated teachers, schedule data and so on. It is not difficult to imagine that such a facility is a very strong tool of management. Queries such as "Give me all students with current year is 'x' and a go-upchance greater than 0.7 that have chosen subject package 'yl, y2, y3' and with a pre school education level 'w' ' are no problem at all. In fact, the effects of all kinds of measurements can be evaluated, *e.g.*, supposed that on date 'd2+1' a change in the schedule is made to avoid truancy in a specific group, then one can ask later on "Give me the total of truancy from date 'd1' till date 'd2' and from date 'd3' till date 'd4', for each lesson of group 'x', ordered by subject.

In schools, one has often to decide on the basis of very partial and informal information because there is a lack of hard, reliable data and/or there is no time to produce that information.

By using a flexible information system the data can be available at low costs and the reliability of expectations can be tested adequately. With one simple statement a school year supervisor can get a reliable picture of a specific student: *e.g.*, how many times he changed between school types and subjects, how many times he was truant etc.

One can simply analyse what the characteristics of successful students are, what bottlenecks in the end of year promotion a specific school type generation features, etc. To demonstrate the feasibility and possibilities of the fourth generation software that enables the flexibility and power here discussed, has been one of the major aims of the project. Up till now the prototype of the SCHOLIS data base and the 'integrated student registration' is nearly completed. The management subsystems are conceptually designed.

In the year in front of us two management subsystems will be developed : forecasting next year student populations and supporting teacher allocation and cluster grouping as part of the preparation of next school year and the statistics as part of the school year evaluation. Because of the flexibility of the data base all kinds of existing school software can be interfaced with the system. There is already contact with some suppliers to elaborate an interface.

In fact, we hope that the data base can serve as a primary tool of integration so that a school is free to choose from a large set of possibilities to fulfil specific needs. Once an integrated data base model is accepted, an integrated, more management oriented, flexible and convertible school information system with contributions of many suppliers and tailored to the school demands, can be realized. Our prototypes are 'only' aimed to be models of the future IS's that should be build by commercial software houses.

Computer based information systems and the improvement of educational institutions

Our opinion is that the computer can be a very powerful tool for the management of educational institutions, both in terms of efficiency and effectivity.

Efficiency

Our research shows that in this kind of organizations people are working with an awful lot of forms and manual databases. The administrative employees are having several databases, the deans and members of the school management as well. The transfer of data from one database to another is not easy in the non-automated situation and therefore this often is not done or only with great delay. This means that everyone is not working with the same and current data.

Moreover, the correction of false data consumes to much labour capacity that cannot be used for other purposes. Lots of internal and external forms have to be filled in and many internal lists have to be produced. Most of the time the same that are used, but every time in a slightly different manner. Every new list or form causes a considerable amount of work.

Not only the administrative but also the staff employees put too much of their time in these activities.

Our aim must be to build information systems that support the relevant data registration and usage within the school just like the data communication with external bodies. When we are able too build these systems in a sophisticated way a tremendous efficiency improvement has to be possible, both at the school level and at the level of the external bodies.

Effectivity

The computer can also contribute to a better realization of the goals of the organization. At first, the above mentioned efficiency improvement will probably have a positive influence on the effectivity, because people will now have more time for important activities that could not be done in earlier days.

In the second place the use of computer can be of value in the policy making process. This can be the case in four ways :

a. The management can get important support of the computer when it has for instance to construct schedules, forecast the needed manpower and allocate lessons to teachers. Complex models are at the root of these activities. Because of this complexity only one or a few solutions are searched for when the calculating has to be done by hand. When one gets at the bottom of these models the computer should make it possible to avoid mistakes, to calculate various alternative solutions, evaluate them on the basis of important criteria and to choose the best solution. It also becomes easier to get an impression of the future situation the organization will be in and to adjust the policy of the organization to these forecasts.

b. For the well functioning of organizations it is important that every organization member has the disposal of the up to date information he needs for his functioning. A problem in educational organizations is that too many people work with old, not reliable data and not everyone is working with the same data. The effect is that false decisions are taken and that the coordination within the organization is problematical. The earlier mentioned central database enables us to enter and change data only once and to supply everybody with the same current data.

c. The computer can give answers to all kinds of questions the school managers are interested in, because of their policy making activities.

d. The use of computers makes it possible to signalize occurrences within the organization that need attention. When we are able to define certain standards the computer can direct the attention immediately to those standards that are not met. This means that the computer fulfils a steering function and that we are able to react very quick to serious developments. When the computer is used in this way its surplus value, compared with the situation where the computer only has an ex post facto registration function, is big.

e. When the relevant data are registered well within an organization computer can be very valuable to calculate the effects of certain policy measures at school level. With the aid of the computer it's easy to get for instance an overview of the aggregated truancy figures for the period after a more preventive truancy policy has been developed.

Some characteristics of educational organizations

We described some possible computer benefits. We expect that the mentioned efficiency must improve when the right software hardware, introduction and training programs are available and the organization has been able to assimilate the computer in its functioning.

We also are quite sure that the first two described effectivity benefits will appear. The computer will make the mentioned complex activities more transparent and lead to better solutions. The advantage of the availability of up to date data also is so evident that we expect that any organization certainly will profit of this computer benefit.

The other benefits are nearly related to the process of policy making and evaluation. We would like to mention some specific characteristics of educational organizations that might influence the computer effects c., d. and e.

We will first describe these characteristics and then discuss their meaning for our subject.

In the literature the following aspects of educational institutions are mentioned :

- The official organizational goals are ambiguous, difficult to operationalize and they often differ from the goals that are daily pursued by the members of the organization. Usually less attention is given to the evaluation of the degree in which the goals are realized by the organization.
- The impact of the organizational technology on the product, in caslet the educated student is not clear. There are many factors within and without the institution which are influencing the product. The contribution of each factor to the quality of the product is diffuse.

  These organizations are 'loosely coupled'. The coupling between organizational elements is loose.
- Decision making in these organizations can be qualified as non-decision, as garbage can decision making. Every employee uses decision making situations as garbage cans in which he puts his problems and solutions. Decisions therefore are delayed or a decision is taken that does not injure anyone, but also not clearly solves a certain problem.

- It are professional bureaucracies in which the operating core, consisting of professional teachers is dominant. They have acquired their expertise during a training of years on a high level. Their own expertise is the most important organizational coordination and steering mechanism and causes that they operate very autonomously. The organization is very flat, it has only a few management levels which consist of -in relation to the operating core- a small number of managers.
- The image of the rational problem solving manager is false. Managers base their activities on impressions, conversations, etc.

The characteristics in relation to the computer impact

We have to realize ourselves very well that the use of computers does not change the described characteristics, but that the influence of the computer will depend on them.

Literature shows us that policy making and evaluation on the level of the organization are problematic because it is very difficult to formulate goals for these institutions that are unambiguous, that can be seen as the goals of everyone and also can be evaluated sharply.

The computer can only signalize and evaluate certain facts, namely those aspects of the organization that are 'computable'. But what about all the other important but not quantifiable organizational aspects? And when do we decide that our goals are not met and whose goals are we talking about? In the most worse case it might be that the computer only will be able to signalize those problems that we were already aware of.

Another problem concerns the finding of solutions to problems. We already mentioned the fact that the quality of our product is influenced by a lot of factors. Many of them are not under our control and it is difficult to decide to which degree certain factors within the organization are responsible for the characteristics of our product. Is it for instance the behaviour of the pupils, or the teacher, the complexity of the subject, the way in which the students were tested, the quality of the school the students come from, that causes the bad results of students?

It is clear that the computer can assist us by investigating relations between variables in order to find the causes and solutions of our problems. On the other hand the problem solving capacity of the computer will probably remain partial and only if the signals of the computer are completed with other data we might be able to develop policies that solve our problems.

Decision making is not a very rational and tightly coupled process in educational organizations. People are not searching for solutions for the central problems of the organization, but attempting to solve their own, varying problems.

This leads to non-decision making and policy measures that are not problem directed. Moreover, the coupling between decisions and their execution often proves to be loose. It will be clear that the introduction of information technology will not change this nature of these organizations. We have to be aware of the fact that supplying more information by the computer will not necessarily lead to the solution of the most important organizational problems.

Literature also shows that the nature of educational organizations is incompatible with policy development in relation to the contents of the work that is central within the organization, in casu the teaching activities. The experts are operating autonomously, and separated of each other. Their own expertise is their most important guide-line and management has hardly and hold of its teaching staff.

What will be the effect of the availability of the computer output that shows that some teachers are underachieving? Will management now at once intervene in the production process? We doubt it strongly, much will depend on the way the organization was functioning before the computer was introduced. Was the management for instance only distributing provisions throughout the organization or was it also paying attention to the teaching process?

If managers take decisions on the basis of the described resources, and not on the basis of 'solid', aggregated data, the value of information technology in this respect might be very limited.

We hope to have made clear that the use of the computer is no panacea for all problems. We already mentioned our positive expectations in relation to the computer, we think that it can be a very powerful tool if it is developed and used in the right way. Literature about organizations show that 'the' organization does not exist, every organization is different. Each educational institute will therefore agree only partially with the organizational characteristics we described. This means that the surplus value of the computer will be different for each organization.

But still it's good to be aware of the possible threats of the potency of the computer. In being aware of them one might better be able to develop and introduce information systems and to support organizations when they re assimilating the systems. One also might then be patient enough to give organizations the time they need to grow to another level of functioning and computer usage.

9

Moving into the Higher Education

Openness is a much-valued concept: we hear of open government, open systems, open faces, open colleges - but while it is universally valued, it has almost universally been treated as a romantic illusion.

Being open necessitates taking risks, and these frequently seem more sizeable than what are interpreted as philosophical gains. Undoubtedly, it is extremely difficult to set up and operate open learning systems within bureaucratic, highly regulated structures. It is part of the necessary and ongoing battle between the need to control and the need to permit creative freedom. Control sets up standards and regulators that permit monitoring, remedial action and effective financial management. Freedom encourages and releases creativity, generates feelings of ownership, and—at the same time - enriches the process and enlarges choice and variety.

The balance between control and freedom in educational institutions is of crucial importance in the development of OL systems and materials. Such provision must be, by its very nature, targeted to precise groups with precise needs. Indeed, even issues like corporate house-style and structural decisions about the design of learning materials can prevent effective operation.

Towards a definition

There is much confusion in the terms we use to describe the situation in which students are seen as active agents in their own learning. Four phrases which hit the ears regularly, and which are frequently used in a way which suggests an easy interchangeability, are 'independent learning', 'distance learning', 'open learning' and 'flexible learning'. If these terms are to be useful to us, we need to be clear that they are not coincident in meaning.

Independent learning simply implies that the learning can be done largely by learners on their own, in any way that fits their own personal style. Thus, any book is a vehicle for independent learning and all students study independently for projects, working in libraries or workshops and frequently setting their own agendas. This sort of independent learning is a widespread phenomenon and has been a feature of 'real education' ever since individuals began to study, research and seek to understand on their own account. It is at the heart of learning, for, in the final analysis, all education is self-education. Consequently, whatever educational structures we set up, this sort of learning is bound to go on spontaneously and productively. In the other hand, it is perfectly possible for colleges, schools and other educational establishments to build on what comes naturally, and enhance the independent learning capacities of their students.

Systematic distance learning appeared on the scene a long time ago. At first, it consisted simply of correspondence between experts and their distant admirers as acts of friendship. Then, as the efficacy of the approach was realized, it developed more normally into a relationship between a tutor and a student. Many teachers enhancing their qualifications forty years ago will remember presenting themselves at the examination rooms of the University of London, clasping their distinctively coloured Wolsey Hall course notes to their bosoms. Since then, Wolsey Hall has identified more lucrative markets, and distance learning has achieved its greatest expansion ever through the development in the early 1970s of the Open University. This massive investment of public resources moved distance learning into a new era of sophistication, using tutor support and multimedia approaches like radio, television and interactive computer programs. It tackled several problems which had long bedevilled higher education. Britain's female population, discriminated against for generations, represented an untapped pool of talent. Suddenly, with the advent of the OU, the opportunity was opened up for women of all ages to engage in university study. This could be done conveniently at a distance, with support and in a way which made it possible to overcome financial constraints, and match the demands of academic work with other family and occupational responsibilities.

However, the OU—in order to remain credible and maintain the structure necessary to accomplish its mission—was forced to erect some barriers to access. In particular, courses generated at Level Two and above had to operate at a level which was demonstrably equivalent to what other universities were providing. Consequently, some of the possible concessions which might have helped students could have been interpreted as intellectual dilution, and had to be avoided. Despite this, the message of 'openness' was taken on with enthusiasm, and the notion of more comprehensive, adventurous and welcoming educational programmes was pursued with vigour.

By the mid-1970s, the use of the term 'open learning' was beginning to emerge. OL was concerned with equal opportunity, and preached the message that whatever training and education individuals required and wished for should be accessible to them. In other words, education should be designed to match more closely the aspirations of learners. Education was to become 'learner-centred'. OL came to imply any situation in which all those features and characteristics of learning programmes and systems which reduce opportunity and access are identified and modified to avoid closure.

Potential gains and associated fears

Adopting the flexible and open approach to teaching and learning can offer real rewards to any college brave enough to install the necessary management and develop or buy in the support required. OL and flexible learning, by eliminating barriers to access and applying the principles of OL provision, can:

- extend the geographical reach of courses in terms of the hinterland for recruitment;
- increase the penetration and take-up rates within the local market area;
- ensure higher success and retention rates among students once enrolled;
- maximize the use of existing physical and human resources;
- enable tutors to handle more students without appreciably increasing their workload;
- improve the quality of the student learning experience, and thereby the reputation of the providing institution;
- enrich and enhance the nature of the tutor's job through variation, open procedures and more creative approaches to assessment.

The overall promise is therefore to reduce student unit costs while, at the same time, improving the quality of the service and raising staff and student morale.

Such an array of claims will undoubtedly be viewed with some scepticism by anyone who has sought to introduce innovatory practice at any but the most mundane level! There are certainly problems to overcome. Institutions consist of an uncomfortable truce between people and structures. Those who already occupy powerful or personally satisfying roles within the existing structure will undoubtedly wish to preserve the status quo. Radical change always tends to increase workload before it eventually rationalizes and controls it. Individuals at all levels are made uncertain as time honoured skills and procedures are called into question. In addition, even those who support the changes know that it is always the new departures which receive the sharpest critical analysis, and they worry about the consequences of failure. Many teachers in FF and HE fear that the new methodologies being advanced will replace them and make them redundant. Such doubts and reservations cannot be ignored. It is a fact that relatively few manage to set then sights on the beneficial consequences of a shift towards more open approaches a different kind of job, more rewarding, more creative and more supportive of students. OL is designed to improve the quality of learning and access to it, not to dehumanize it or to shake out dedicated staff.

TVEI, with its encouragement of networking between schools, colleges and businesses, its penchant for student-centred active learning, its keen interest in technical and vocational areas, and its willingness to back these predilections with support in a variety of forms, provided a powerful launch-pad for this development. Derek Wallace, the TVEI coordinator at Wearside College, was interested from a number of points of view:

- the teaching methodology used within the college was frequently passive and tutor-centred;
- the OL centre at the college and the technical support available already provided a focus of expertise for development;
- the college needed to compete effectively with other local providers in terms of quality provision;
- the need to recruit meant exploring new markets;
- the staff were nervous, insecure, doubtful and frequently cynical. Indeed, many new developments including this one were perceived as threats rather than opportunities;p

Twenty years ago, J.D. Nesbit' suggested that there were four main consequences of innovation :

- an increase in workload;
- a period of acute anxiety;

reduce these feelings. Indeed, the documentation designed to help frequently engenders panic reactions and a retreat into safer ideas. Confusion and disorientation do require the presentation of ideas, but only within a context in which their practical implications can be worked out, discussed and mulled over. In this workshop structure, principles spilled over immediately into product evaluation; structure and design translated into product design; house-style considerations and 'fast-write' led directly to planning and writing.

Defusing the fear of an evaluation backlash

Fear of some awful judgement was reduced by the informality of the workshop activity. It could not be expected that every participant would experience the same level of success. There were no retributions to be faced. Attitudes to new styles of teaching were expected to change, but often the benefits were departmental rather than personal. Progress in the Wearside College Construction Department, which embraced the ideas enthusiastically, built up a knowledgeable and positive team and delivered some solid achievements. Nevertheless, not everyone in the department felt like, or wished to be, a writer. The evaluation which did take place involved interactions between peers and within departments. Only the workshop providers felt some legitimate unease about evaluation!

Rescuing the development from doubt, cynicism and hostility

Fast change in recent years has made many teachers feel defensive and unsure about the validity of what is happening. This response to educational change was modified by clarification and by exemplification. There should be no pretence, and while the workshop itself had to be good of its kind, the learning materials it brought to the attention of the participants during the evaluation activity had to be carefully selected across the full quality range. Poor, hastily designed and relatively inadequate materials were an essential element in the evaluation activity. Workshop participants realized that a simple contrast between 'good' and 'bad' materials was not the point of the exercise. Quite rightly, thinking turned to improving materials, enhancing their effectiveness, and building on their virtues. The lack of planning—obvious in some published materials—made points about time, the level of resource availability, or both.

The first workshop stirred many reactions. The working products which resulted with professional supports were being used in classrooms within a matter of days. These materials raised aspirations, gained adherents and fuelled the process. In all, the first workshop and five repeats each involving about sixteen participants—meant that about a hundred college staff had been through the process by the end.

One model used in these initial workshops proved very powerful in picking up the structures necessary to support student-centred approaches. At one level, it was seen as a micro-model for the development of one learning product—it implied generating materials which incorporated support and management. At a macro-level, it was seen as a model upon which a college might base its management structure. At this point, the methodology begins to move beyond the ambitions of individual writers and their creative, student-centred learning materials.

The last of the six initiating workshops ran in January 1993, and the key participants at Wearside—Peter Eagle, assistant principal, and Derek Wallace, the TVEI coordinator—began to respond to a demand for two higher-level workshops. Clearly, at this level, it would be possible to address in more detail the options open to potential producers and users :

- *the level of production* : from generating new products, through customization and enhancement of existing materials, to 'buying in';
- *the media presentation* : exploring media choices from paper, through audio, video, interactive video and computer-based to mixed-mode;

- *the selection of assessment mechanisms* : self-assessment, peer assessment, mentor assessment, tutor assessment, computer-based assessment, work-based assessment, and the measurement of competence and performance.

It was also possible to clarify, explore, suggest and discuss in an increasingly openended way - for example, beginning to generate a typology of study guides; teasing out what is meant by an assignment briefing; deciding on the nature of worksheets or handouts; creating quality criteria for learning materials, and much else besides.

Increasingly, the development was moving in ways which were as creative as they were unanticipated. Inevitably, intermixed with all this creative thinking was a complex web of political interactions. The truth is that educational innovation, while possessing its own kind of chaos, has also to respond to turbulence within the system, the management, and the personalities involved. Innovations are never straight forward, but even chaotic butterflies flapping their wings can cause storms, and storms can distribute the seeds of good ideas.

10

Artificial Intelligence in Higher Education

One natural way to get students into involvement with AI, is to make them use AI tools. On the other hand, we should distinguish between AI application to knowledge-domains, and AI tools that are specifically devised for teaching those domains.

In expert systems in general, knowledge engineers focus on knowledge-representation(s), and expertise is provided by an expert in the application domain.

In ICAI systems, instead, it is an expert in education that is needed, not (only) an expert in the domain taught. ICAI systems should focus on knowledge presentation(s).

Prof. Jill Larkin, of the Carnegie-Mellon University, prefers the compound knowledge presentation to the term interface, as the notion is by no means accessory. She has pointed out that ICAI systems are being developed with an inadequate involvement of experts in education. This fact "leads intelligent tutoring systems to emphasize representing the knowledge to be taught, with less attention to how this knowledge is communicated to a learner". Excellent screen presentation and interaction is required.

Current technologies allow to work out attractive screen presentations; it is the current practice of CAI/ICAI that lags behind.

It is most important that principles be laid for the design of AI-based instructional software. I ignore whether funds would become available as envisaged in the proposal of the educational Star Wars, but what is certain is that, as long as imperative guidelines are not applied in practice to ensure ICAI an excellent educational quality, then the availability of the AI technology itself would be dilapidated for the domain of instruction.

Some computer games with educational ambitions are left to the programmers themselves to develop. However, beside computer games, I think that it is a matter of course that computer people that implement CAI or ICAI systems shouldn't be expected to have the application domain or educational competence for having the whole development task left to them.

Of course, the problem is with the people that are available to develop a project. ICAI systems developed in AI laboratories may have a domain-expert available; however, it is not the expert in the application domain that matters certain. Not the best domain expert, but the best educator makes the best ICAI tool, provided that the knowledge engineer is also capable.

As a matter of fact, who is an expert teacher? For the sake of precision, we must recognize that the expert teacher is a mythical character, a conventional role. There are several divergent approaches in education. Practically, you identify the expert teacher with the model you are an adept of. Such a professional alter ego is not unique: a hypothetical vicar on earth of earth of your own decarnate ideal of teacher, should not be expected to be judged the best teacher by your neighbor. However, this should not be a real problem in ICAI projects, as the people involved in a given project are expected to have a given opinion on didactic models.

In a discussion I had with A. Frenkel, we agreed that CAI and ICAI systems as they are today usually with a boring interface, based on text only interaction, or possibly even with poorly designed graphics may prove even detrimental, didactically, just like dull teaching.

When, during the Seventies of the 18th century, Lorenzo Mascheroni defended mathematics with the verses that, in translation, say: "As mathematics Never hurt you, Why do you hate it In so crazy and brutal a way?" his assumption was wrong: people who loathe, say, mathematics, were often frustrated, as pupils, by a wrong didactic approach. People fear or hate mathematics because they didn't manage to attain a good level of proficiency or confidence, and a major role in this failure should often be blamed on the poor performance of boring or even "terrorist" teachers.

The problem of didactic is fundamental for higher mathematics as well as for introductory courses. We could talk about chemistry, or any other hard-science or engineering domain, but let us develop the example of mathematics. Some kind of notation may be found even in arithmetic problems found on clay tablets; however, since the Middle Ages, formal mathematical notation as we know it was developed gradually. In general, notation is a technical language, suited for communication in a given application domain. Today, one of the problems is teaching that language properly. This may be problematic, e.g., in the didactic of programming languages, but in traditional domains, didactic problems with notation are minor, as compared with ancient didactic with little or no notation.

The Centro Studi della Matematica Medioevale of the University of Siena has edited several texts in medieval mathematics. The didactic of mathematics, as documented there, exhibits major flaws due to the absence of an adequate notational suppport. Those books list textual, verbal exercises that are extremely dull, albeit most often applied to concrete cases. As being a layman in the philology of medieval mathematics, I found only one exercise interesting in a text by Filippo di Calandro Calandri, of the end of the 15th century and even then, only moderately interesting, and only in the problem statement, while certainly not in the presentation of the resolving procedure proposed. The problem involves two persons playing an ancient ball game; they are assumed to have agreed that the first who marks six goals, would win. However, when the score is 4 to 3, the ball is pierced, and so the game cannot go on. The exercise asks to indicate an equitable division of the stake. I confess that I found the problem interesting only because it seems to depict the current quality of sports equipment in Tuscany about the time of the discovery of America. Probably, by then the exercise didn't seem as ironic, as we may find it today.

Are we facing a similar, primordial situation in CAI?

Students shouldn't be faulted with getting bored; it is the tool that is faulty. You cannot argue with boredom: as a story in the Babylonian Talmud goes, once "Rav Nahman said to his servant Daru: 'If I fall asleep during the first verse, worry me so that I may be wide awake, but do not proud me for any more.".

There is something that we can do to enhance tutoring systems.

It is crucial, for the success of ICAI, to avoid that wrong didactic approaches be justified or even legitimized by invoking alleged technical limitations of the computer technology itself. An expert in human/computer interaction, Mike Underwood of the Alvey Directorate quoted explains that "currently computer technology, is moving from being a 'How?' based technology to a "What?' based technology, where we ask questions of what goals our expertise in new technology will allow us to achieve rather than how to achieve them."

In higher education, the problem of interface in ICAI systems is by no means less important than the same problem in systems oriented to children. In fact, to keep attention focused, only tactical means may differ. For example, graphic animation for addressing children should support a kind of communication different from the kind suitable in higher education. However, the attention problem itself remains. Not only: attention alone is not enough. More in general problem is the didactic quality of the way the domain knowledge is conveyed. It would be wrong to assume that adult students should cope with knowledge-presentation as coming directly from the domain expert, instead of the domain-teacher.

Exposes approaches to the application of computing to higher education, and illustrates them in the case of civil engineering. One approach exploits professional software-packages that originally weren't meant to serve didactic for training in applicational courses: "they are suitable instruments not for illustrating theories, but only for verifying their utilization." Another approach trains students to program. The third approach, instead, is the one involving systems devised specifically for didactic. "Such a kind of approach, unlike those previously considered, requires to globally rethink didactic methods."

There is a considerable investment of efforts to be done on the part of both CAI system developers, and teachers adopting the systems. For teachers, it should be a kind of self requalification. Their ambition shouldn't afford to neglect the challenge.

Exploitable trends in artificial intelligence and interaction

A merger based on a theory of multimedia expressiveness: Towards automated knowledge presentation synthesizers

Current technologies of human/machine interaction allow to work out attractive screen presentations. However, certain aspects of developing presentations could be partly automated, in the next generation of ICAI systems. Several trends in AI or cognitive science could be integrated to improve knowledge presentations, but we should first recognize such a perspective, in order to have the new generation actually developed.

We are going to discuss such disparate topics as:

- Nowakowska's formal theory of multimedia expressiveness;

- hypertext and hypermedia systems;
- windows versus multi-screen displays;
- multi-modal human/computer interfaces;
- natural-language processing;
- computational models of metaphor and analogy;
- computer story-telling and story-retelling; and
- computational approaches to aesthetics, models of attention; and
- models of focus.

I propose to consider Nowakowska's theory as being a bridge leading from the mentioned natural-language processing approaches to extensions of alphanumeric interaction that exploit new multimedia computer-based communication technologies.

Probably, the main problem with developing the integrated approach I propose is that so far, researchers involved in the single trends have worked without collaborating. If more people were involved in research or practice in each sector of those mentioned, then collaboration would be more likely to occur. Should we then give time more time? I would rather prefer that induced technology-awareness would speed up the process.

Let us consider, first, Nowakowska's theory of multimedia expression. The starting point is the fact that the same message may be conveyed differently by saying it, or by writing it, or by dancing it, or by performing a pantomime, or by drawing a cartoon. You make different efforts to understand the same message as conveyed by a silent film, or by watching a movie on TV with the sound off.

Proposes a formal theory of expressiveness of communication "as carried out simultaneously on several media, such as verbal medium, accompanied by gestures or other body movements, facial expressions, and so on".

Multimedia Units of communication are an extension of the role played by words in spoken or written communication. Multimedia units, however, have a number of components corresponding to actions on various media. Units may be planned in context, to convey a message with a certain meaning.

A future kind of intelligent tool could generate attractive knowledge-presentations, by selecting suitable media to convey a given message. For example, the media-selector could resort to a cartoon, and decide whether it should perform a pantomine instead of having bubbles containing the text of ulterances. Gestural expressions of an animated character on the screen, short texts, tables, graphics, the display of objects, etc., may suit given situations, to express contents planned for communication.

Graphic animation techniques today may already resort to dynamic models of lips and facial articulatory movements, displayed to accompany utterances.

Body movements in graphic animation may be programmed in a language for computer choreography.

Beside knowledge on the general student who is expected to use the system, an effective intelligent tutoring system should be able to accommodate individual differences. More in general, this is a problem of user/system interfaces. Is a bibliography on the role of individual differences among users, in human/machine interaction.

Methods of machine learning could be exploited by a knowledge-presentation systems, to build its own model of a given student. The state of the art of machine learning already allows to build user behaviour models, to some extent.

As being a further step in the automation of teachers' skills, such a tool would be very important. In fact, computer-assisted instruction is a trial to obviate the shortage of human tutors, once the goal is set of establishing a one-to-one relation between teachers and pupils, in order to enhance education.

The goal of the expert systems technology is to automate skills that are in short supply; once properly applied to education, this technology yield intelligent tutoring systems.

In the construction of intelligent tutoring systems, the input of knowledge-presentation synthesizer, acting as being an interface between the knowledge-base and the direct interaction with the tutee, would relieve the human tutor from some relatively low-level processing of the knowledge entered. This way, the human tutor would be free to expand the didactic program meant to be covered by the computer tutor.

Once the artificial tutor has acquired the skills of producing attractive knowledge-presentations, then it may select a suitable style of presentation according to various parameters, including also parameters belonging to its model of the specific student.

Instead, the human teacher whose knowledge has been acquired into the artificial tutor, couldn't tailor a priori the presentation for the specific students going to use the tool. That human tutor could only forecast certain classes of performance or character.

There is one more reason in favour of automatically generated knowledge presentations; economy in embellishing communication. For example, for the purpose of communication, "one could imagine having access to a very large database of easily editable and manipulable video images. Provided a powerful and flexible enough interface, a communicator could illustrate various points by accessing and portraying segments of these video images. This is done, of course, in the production of movies, slide presentations, and videos". However, there is a major limitation. Successful, manually crafted CAI systems integrating advanced audiovisual technologies, and software I think, for example, of Project Athena, at the Massachusetts Institute of Technology are necessarily limited in their personalization towards the individual student, because of an obvious principle of economy, beside the need to forecast the spectrum of student behaviour. Without mentioning any particular system, goes on: "While such presentations are effective for one to many communication, the production of such images is currently too cumbersome and expensive for one to one or many to many conversations". This is a good reason for trying to automate the generation of knowledge presentations.

In the following, I am going to survey advances in computing that may be exploited by the expensive medium selector. The selector should be controlled, inside the knowledge presentation synthesizer, by automated skills of dramatic production, with the goal of effectively expressing the particular knowledge that has to be taught, in a given situation, on interacting with a given student.

Enhanced methods of interaction

On the progress in human factors of human/computer interaction. Such interaction is the subject of too. On user models resorting to artificial intelligence in human/computer dialog.

Multimedia computer systems are being developed.

Besides, the traditional, sequential access to text, to which human readers used to be forced by the physical layout of documents, is being overcome, by genralizing the access by means of a network of pointers. The generalized organization is termed hypertext, or, if images are also included, hypermedia.

The idea of hypertext systems is not new. In 1945, Vannevar Bush, an information scientist, proposed the MEMEX model of document organization; microfilms were to be the support as originally intended by Bush for that archetype of hypertext. As to the very name, it is due to Theodor Nelson, who, in 1965, proposed the HYPERTEXT model.

Lefrere 84 is a tutorial on hypertext, especially from the viewpoint of text processing. describe TEXTNET, a document-manipulation system where text is organized in chunks, that are vertices in a network, and are connected together by links, each having a type. Possible types of link include; example, proof, refutation, etc. Structural information is disjoint from the text itself, thanks to the introduction of structural nodes between text nodes. The approach is criticized in: "It may be that creating a text as a collection of separate chunks impedes development of a feeling of narrative flow or sustained argument.' This criticism is directed especially against the use of the text-network approach as being an extended text-processing tool in the process of composition of scientific papers.

Hypertext and hypermedia are gaining popularity, especially as applied to on-line encyclopedias. On electronic encyclopedias.

Of course, a didactic corpus with an encyclopedic nature shouldn't be mistaken for a didactic environment in general. Electronic encyclopedias, and hypermedia in particular, couldn't be the solution to the problems of computer-assisted instruction. Rather, as the considered approach is very supportive of exploration, it suits the Epicurean paradigm of education: going for a walk in a garden.

States the following three general educational objectives of Intermedia, a hypermedia system of Brown University, audiovisualization, and exploration. The first aim is "to facilitate the observation and creation of connections and relationships among ideas, concepts, events and people", and, therefore, "to provide software tools that will allow professors to create webs of information and that will allow students to follow trails of linked information, annotate text and illustrations, and communicate with other students and the professor. "The second aim, termed audiovisualization, is "to enhance the student's ability to visualize and perceive complex and/or dynamic phenomena." As to the third aim, it is to encourage exploration in an information-rich environment.

As we have seen, hypermedia systems are the outcome of the union of hypertext with non-alphanumeric information, and especially with pictorial information. deals with pictorial processing an connection with pictorial information. deals with pictorial information processing in connection with natural-language interfaces. On natural-language processing, see the next subsection. Human-computer dialogue in pseudo-natural language does not usually need the full power of in-depth natural-language understanding and generation. Surveys three formalisms in use for modelling and specifying dialogue in human-computer interfaces: transition networks, context-free grammars, and event models. The latter are claimed to be more expressive, and and algorithms of conversion from the previous models into event models are provided. Also discusses notations for designing user-interface management systems.

Workstations allowing to work with windows, meant to show relevant information concurrently on the screen, may be irritating. Characters should be tiny, or windows need to cover each other. As an alternative to windows on the same screen, at the University of Maryland ways have been explored to fuse several screens together.

Discusses the technique of graphic equivalence in human/computer interaction. It involves the redundant use of split or dual screen hardware configurations, and is based upon the notion of "cognitive amplification via the simultaneous presentation of data, information, and knowledge in different forms" for example, in a military application, the left screen displays alphanumeric information, while the right screen displays the same information in map form. Another technique that Andriole discusses is graphic explanations. Graphical explanations are those that permit users to see graphically the analytical components of system-and user-generated problem solutions". Graphic information is displayed, in this approach of Andriole's application, on the left screen, while the right screen still displays a map. The third technique discussed in the same paper is embedded process modelling, that is designed to help users to locate stages in the problem-solving process. Applications of graphic animation are instantiated even in rather abstract domains, such as computer programming, and, then, in the didactic of the domain. Independently from animation, proposes naive realism as being a paradigm of human/computer interface design, to enhance the under- stability of the computer system subserved by the interface: "all computational objects will be created, represented, and manipulated in essentially the same way, and the user will be able to pretend that the objects themselves are their visual representation."

The naive realism paradigm may be adopted in applications resorting to computer graphics, but you may develop a system enhanced by computer graphics, even without sticking to naive realism. For example, in CAI, you may garnish a presentation by resorting to an animated character embodying a narrator, or to characters simulating playing agents, without necessarily representing a strict and total mapping with concepts taught.

In particular, and investigate how effective computer animation is in didactic.

At the Scientific Centre of IBM in Los Angeles, work is in progress on the MUSES project, lead by Linda B. Sorisio, and meant to produce a system giving tutorials in music theory, and capable of servicing a first year undergraduate course in music. The system involves graphics and sound, simultaneously. It is being developed by using an IBM environment of developing expert systems. For computer music in general, that is a guide to current projects.

In computer music, too, one should distinguish between tutor systems, and professional tools. MUSES is devised specifically for instruction. Instead, the Intelligent Composer's Assistant developed at the Massachusetts Institute of Technology, is a tool for the professional composer, and is meant to support the composer in creative phases of composition.

Establishes some design criteria for music interfaces. In particular, Sec. 3.5 in that paper deals with computer-aided instruction in computer-music systems.

Beside applications to music, and beside speech-processing, sound may be involved in interaction to convey given messages through conventional sounds, that are termed auditory icons.

Speech processing is a possible mode of interaction in certain advanced interfaces. However, there is a major problem for the perspectives so widespread use of speech processing components: especially when a large vocabulary is involved, speech recognition does not work well, yet, when confronted with the indiscriminate user, because of the variability of speech patterns as found in different speakers. To overcome this problem, adaptation to the speaker is being investigated by resorting to machine learning. Cf. by Marcel Tatham, the father of the cognitive phonetics school is a tutorial on both speech processing and natural-language processing.

Surveys speech processing, by covering speech analog-to-digital coding technology and applications, speech synthesis and recognition, speech-to-text conversion trials, text-to-speech synthisizers, speaker verification, and interaction by voice involving speech understanding.

Speech synthesis is easier to implement, if the input is a phonetic or phonemic transcription. Text-to-speech conversion, instead, involves orthography. Machine learning is being applied to text-to-speech conversion systems, especially in order to investigate a cognitive model; describes a class of massively parallel network systems that learn to convert English text to speech. The more words the system learns, the better it is at generalizing and correctly pronouncing new words. Besides, in the described class of systems, relearning after damage is much faster than learning during the original training. This reminds of the way humans learn again a foreign language they forgot.

As we have seen, the sense of hearing may be exploited, in human/computer interaction, when auditory icons or even speech processing is resorted to.

Other, two senses, vision and touch, are combined in another mode of interaction, that requires special hardware, but that generally is affordable in personal computing and in education.

Touch-sensitive screens, or touchscreens, have gained a certain, popularity, along with mouses, as being input modes accompanying the keyboard in interaction is a review on touchscreens.

Further input modes, in multi-modal interfaces, may include combinations of speech, gesture, and looking. In particular, lip-reading by machine, body-tracking, reading facial expression, eye-tracking and glance detection, as well as eye-responsive graphics and sound, involve machine vision, and are being investigated in the framework of research in human/machine interaction. Multi-modal interfaces are being explored, *e.g.*, by Richard Bolt at the Media Laboratory of the Massachusetts Institute of Technology. On human movement representation and understanding. Either in human beings or in machines, resorting to different kinds of sensory perception requires integration; on intersensory perception and sensory integration in humans.

Anyway, interfaces that respond to facial expression, or to body movements other than through a keyboard, or a mouse, or a touchscreen, don't seem to suit the actual needs of academic education during what is left of this century. Instead, such modes of interaction should interest applications in preschool, primary, or special education. Let us consider again multimedia technologies: they process alphanumeric text, as well as iconics; they may include also sound.

Multimedia technologies already offer what possibly is an embaras de richesse, in drawing from which, a system designer decided to exploit the new technology may go a stray and forget about the actual goals of the application. For applications in education, then, the tool could be visually impressing, but useless or detrimental.

Without a careful instructional designer to develop good knowledge presentations, the application of technical devices, such as graphics, or touchscreens, would result just in fancy software for CAI. New approaches to the organization of a corpus of documents with didactic knowledge, may support the work of the education experts.

In interactive encyclopedias such as The Interactive Encyclopedia System of the University of Maryland, developed for the U.S. Holocaust Memorial Museum novice users may explore information resources by merely touching, on a touchscreen, topics that interest them. Then, relevant information appears on the screen. As states, "TIES is attractive for instruction because the author's ideas and writing style are the focus of attention", and the author may create a network of conceptual knowledge, by association. "Through careful human factors design, the computer aspects have been trimmed to let the author communicate to the students and to allow the students to control their learning.".

Networks of text or of multimedia information may help in the struggle with the acquisition bottleneck in tutoring systems. This problem is detrimental to the quality of CAI or ICAI systems, not only because the content isn't developed into depth, but also because the material is not updated. The problem has been stated, e.g., for PLATO, a classical system for medical education: "The contents of the medical curriculum must constantly change to keep abreast of changes in medical knowledge. This obliges the developers medical CAI to be prepared to undertake the costs and burdens of frequent lesson revision', while, on the other hand, "faculty at medical schools are in general less involved in teaching, in terms of the time they are prepared to spend on this activity, than are faculty who teach at lower levels in the educational system. Thus, a higher degree of motivation must be provided them in order to gain their cooperation.".

Expert systems allow to store pluralistic expertise. However, it is not necessary to use a blackboard organization to support multi-expertise.

The instructional system should include both an instructional knowledge-presentation component, meant to interact with the student, and a component for interactive instructional authoring. The principles of design of the authoring system are most important both in terms of author's motivation, and of product feasibility for producing a principled and good knowledge-presentation system.

Hypertext approaches may allow to augment the content of the system, incrementally. With a suitable investment of time, and with several authors available, it may be possible to store at least nearly constant curricula, and even to support branching in instruction. I am referring to the development of individualized programs in education that "exploit error, instead of banning it", as the student's errors trigger the expansion of a visit through a tree of didactic chunks.

CAI and ICAI may support both behavioristic and cognitive approaches to education. The material possibility, for a team of authors, of developing a didactic corpus in a network, could enhance the depth of exposition in knowledge presentations, both from the viewpoint of the application-domain, and of the educational approach.

Natural-Language Processing

NLP may be subdivided into natural language man/machine dialogue, and full-text processing. These areas are not disjoint.

Man-machine interaction in natural language involves some problems that are different with respect to text-understanding. One of the approaches to natural-language interaction is based on speech acts: locutionary, illocutioanry, and perlocutionary. Interacting subjects plan speech-acts in order to satisfy the goal of obtaining specific responses from each other. The computer system, as being one of the actors in the interaction, needs a model of the partner, and needs some pragmatic competence in human interaction. Suitable knowledge structures contain representations of typical contracts of interaction.

Action-story understanding heavily depends upon the recognition of characters' goals, that they try to achieve through plans.

In that system, linguistic knowledge needed to encode discourse information is specified by means of a functional-grammar formalism "with assertions about how grammatical choices are used to achieve various goals." "Planning provides the basis for a theory of language generation that considers the communicative goals of the speaker when producing utterances."

The UCLA approach stems from the Yale approach: at the UCLA AI Lab, Michael Dyer, Margot Flowers, and others have developed systems that analyze a story, and retell it from an emotional angle, or detect ironies.

As puts it, "Reasons and plans are related, but not identical. Plans are intended by goals, and executed in order to achieve goals. In contrast, reasoning is used to present arguments which support or attack beliefs." Understanding in BORIS, an in-depth text-understanding system, is based on recognizing instances of TAUs, that is, patterns involving the failure of some goal of some character in a given story. Knowledge on given concepts is represented in MOPs. Simplifying MOPs may be conceived as being graphs with labeled arcs from goals of characters, to plans, or from plans to goals. For example, a plan may achieve a goal. MOPs may include further information as well, and they possibly point to other MOPs. Scripts were an earlier kind of knowledge-structure for understanding, that unlike MOPs doesn't include goals, and has to be self contained and doesn't point to other chunks of knowledge.

ABDUL is an arguer: a system that take a side in some argument, and constructs reasoning chains to convince an opponent, by trying to refute the latter's reasoning. ABDUL is able to carry personal attacks.

Pluralistic thinking may be supported by AI systems: *politics* is a system able to simulate human ideological understanding of international political events, by assuming the priority tree of ideological goals that is the set of ideological beliefs of either liberals of conservatives in the U.S.A.

A thesis in machine learning, presents a computational model of learning from analogies of te kin tutors resort to. This model is implemented in a program, CARL, that learns a restricted topic: the use of variables in assignment statements, when programming in BASIC. The learning process proceeds by generating analogical hypotheses, possibly erroneous. When additional examples are given, the analogical model is extended to account for them: incrementally, the system finds and maps representations of causal and planning knowledge about given analogies drawn from familiar domains.

In the area of metaphor recognition, particularly interesting is the theory developed by Bipin Indurkhya of Constrained Semantic Transference, based upon T-MAPs, that are "partial coherent mappings from the source domain to the target domain" of metaphor. Albeit CST seems to be more general than previous theories, CST is not decidable. To overcome that, Indurkhya has developed also Approximate, Semantic Transference, which s computational, as coherency is replaced there by approximate bounded coherency. Indurkhya has implemented programs rather inefficient, however that embody algorithms that can generate, from the domain knowledge, AT-MAPs, that is T-PMAPs that are approximately coherent. In computing for the humanities, the stylistic use of metaphors is analysed sometimes by checking for the presence of metaphoric terms, about which the program knows because they are listed as suitably associated with lexical entries, in a data structure. Practically, the program does not analyze the very fact that terms are metaphoric: they could have been just synonyms. Such applications can afford renouncing artificial intelligence and, in particular, the semantic analysis of those features that make the use of a term metaphoric. For example, in the framework of a project on foreign language learning in higher education, Noemi Messora has conducted at the University of Warwick a computer-assisted comparative investigation of the metaphoric use of terms in stock-exchange reports in the English and Italian press.

Story telling

Story telling is a growing area of natural-language processing, and is strongly related to research in planning and counter planning.

Proposes a model with five interacting processes. They are: a plot-maker, a world-maker, a simulator, a narrator, and a text-generator. Yazdani's system ROALD corresponds to the simulator. ROALD has a representation of the world with the involved characters. It is given the general guideline of the plot.

A planner is associated with each character, that plans the actions that the character would like to carry out in the world. The point is that those plans are thwarted. The simulator has a problem-solver, that receives the plans of all characters, and it introduces props, distractions, and accidents, so that the actions of other characters are thwarted. ROALD's overall goal is to make sure that the simulation follows the required by the input plot.

An earlier system, TALE-SPIN was a simulator allowing for only one active agent in the world of stories. Another storyteller is described.

In a knowledge-presentation synthesizer, a story-teller could develop an allegory. However, a too flamboyant presentation would obscure the content. Therefore, the storyteller should develop allegories by employing a limited set of stylized, conventional expressive means.

Please think of stylization as in the ancient Egyptian paintings: by reducing the set of possible expressive elements, a beautiful effect was obtained. Knowledge-presentations with some skill in story-telling could be devised, that present knowledge by building up a possibly metaphoric story based on conventional macro-actions.

Such a limited lexicon of macro-actions would help to keep attention from astray after unessential details born by the communication media selected. A freely-constructed story may divert attention from the actual content being taught. Just think of too nice items of advertising: I would rather remember the device, and forget about the product advertised. Such an approach to story-generation, with a limited range of macro-actions, is typical of Vladimir Propp's approach to the Morphology of the Folktale, that has been seminal for structural analysis and the morphogenesis of folktales, in ethnology.

Computational approaches to aesthetics

I mentioned excessive flamboyance as being detrimental, in knowledge-representations. Another, more obvious danger when there is an embaras de richesse of expressive means, is kitsch.

How could we teach an automated knowledge-presentation synthesizer how to avoid producing kitsch?

Giving an "intelligent" tool aesthetics judgement, is at least as difficult as giving it common sense, and it is a far goal. While common-sense modelling is a fashionable topic in artificial intelligence computational models of aesthetics judgement in AI are still rarely heard of.

Until the beginning of the Seventies or even afterwards, in outdated treatments of AI or of computer art there was an excessive hope in computational aesthetics.

Besides, outside AI, computer poetry of computer music systems have been built, that generate compositions that cannot claim good taste. Even though such compositions used sometimes, to be finished by human artists, the outcome is not artistic.

Meanwhile, it has become clear, in computer art, that computational tools should just subverse the creative needs of the human artist, and have to be controlled by his/her aesthetics judgement. The present state of technology doesn't allow computer tools to replace human creativity in the arts.

Computer graphics may yield even astonishingly beautiful results, if used by a creative artist with good taste. Nevertheless, the computer tool is just an extension and an amplifier of the artist's own hand, while automated cognition is not involved.

On the other hand, some steps have been recently made towards AI models of aesthetics judgement in narrow domains.

At the University of Regina, Wong and Ziarko have dealt with inductive learning from rules. Rules they considered, express aesthetics judgement, and are stated by a human expert. Vagueness is expressed by means of rough-set theory.

Automated skills of aesthetics analysis seem to be a far goal, as practicable in a reasonably broad range of situations.

At the present state of the art, something could be nevertheless done for aesthetics, in an automated synthesizer of knowledge presentations. In fact, aesthetics criteria for the purposes of generation could be conveyed by rules of thumb, excluding certain classes of composition, or prescribing a certain relationship between displayed components.

Models of attention and focus

After having insisted so much on the need of attractive knowledge-presentations, I have to recognize that attention could not be kept constantly high.

As the Italian actor Vittorio Gassman has put it: "Even some piece of boredom should be conceded now and then to the public, to restore its tension. Boredom is an undervalued color, yet it is supremely human. As Goethe said: 'If apes could grow weary, they would be human being's.'

Probably Goethe was wrong from the viewpoint of animal psychology. Yet, the point is that the moments with less tensed attention couldn't be eliminated from human activity, and in particular from human/computer interaction for didactics: too intense a session would be likely to involve negative phenomena related to the tension of vigilance. On vigilance, discusses stress in connection with computing.

The solution could be: becoming able to dynamically calibrate the user's response in terms of attention.

Models of attention should account for that, especially in an automated selector of communication-media, as the one whose concept I propose. In natural-language processing and common-sence modelling, models of focus are being developed from the viewpoint of semantics and speech-acts that perhaps could be exploited in the frame-work of computational models of attention. Interactive question answering may have complicated semantics and pragmatics: an annotated bibliography on this issue is. For example, the question "Do you know the right time?" is not intelligently answered by "Yes". The question has to be over-answered, since it is an instance of yes-no question that pragmatically must be interpreted as a wh-question.

Knowledge about when over-answering is needed, involves knowledge on the pragmatics of natural language interaction between humans. Anyway, over-answering fits in the framework of models of focus. Typically, models of common-sence are involved; on common-sensce modelling.

If an automated multimedia knowledge-presentation synthesizer were able to recognize possibly, by being told what is the climax in a given interval of a session, then the knowledge presentation synthesizer itself could expolit a model of varying attention to calibrate the means to draw attention, in such a manner that the selected means would suit a track of varying importance associated with the session-flow. You may imagine the importance-track as being a function y = f (x) drawn in a plane, where the x - axis is time, and the y - axis is importance.

The determination of such a sequence of importance-levels, requires an evaluation process of the goals of the considered course or lesson, and of the subgoals involved in overall plans meant to achieve the overall goals. This process, that may be set in terms of planning, involves semantic-focus evaluation in the framework of the machine-understanding of the material entered by the human teacher.

The determination of the importance-track involves also the subservient construction of an interdependence graph of importance: the importance-evaluation component shouldn't underestimate the importance of an element that is necessary for a correct understanding on the part of the pupil of a successive, definitely important concept.

Anyway, this evaluation and design process produces a protocol of interaction, that once it runs in a given session, materializes into a temporal sequence of consecutive single displays on the screen.

This is a dynamic aspect. Now, let us concentrate on the statics of the single display.

Automatic recognition of the current semantic focus of the message to be conveyed, should be reflected in screen-organization, that is in the design and the lay-out of single images displayed on the screen, as extracted at a given time from the temporal flow of displays.

The focus of the images displayed should match the focus of the message conveyed. Please observe that displaying too showy visual-attention distractors may be detrimental. On preattentive versus attentive visual search.

11

Potential Use of Higher Learning Contracts

Higher education in the UK is facing a critical era in its evolution. Perhaps the most important ingredient in the miscellany of changes is the recognition of the need for change itself. Central to that recognition is the necessity of creating a system which:

a) acknowledges a shared responsibility for learning between teacher and learner;

b) concentrates on educational processes as well as educational outcomes;

c) can franchise and accredit off-campus learning; and

d) is responsive to the individual learning needs of an increasing, diverse student intake where didactic teaching is giving way to increased learning facilitation.

Whether the recognition of these directions of change derives primarily from ideological preference or from economic necessity will, no doubt, form the background to future debate. Our task as educators, however, is to ensure that quality of the student experience is enhanced and not diminished by change, whatever its impetus. From the evidence at the conference and the chapters in this book, it should be obvious that our contributors have recognised the value of learning contracts in implementing many of the ideas central to the current changes in higher education.

Commonality of approach

From all the contributors, some common approaches have been identified. They have emphasised the importance of:

a) enabling a shared responsibility for negotiating goals or objectives;

b) recognising that the process issues of planning, monitoring and review of educational outcomes are as important as the outcomes themselves;

c) involving the major 'stackholders' in the process of managing off-campus learning; and

d) the need for staff and students to recognise and understand the shift in roles and responsibilities that use of learning contracts implies.

Variability of practice

While some commonality of approach can be identified, so too can the variability of practice. Thus far the use of learning contracts is evident in:

a) components within traditional degree programmes such as project work, placement, seminars;

b) activities aimed at developing specific skills;

c) the assessment or self-assessment of learning outcomes or competences; and

d) whole educational programmes.

The variety of practice in the use of learning contracts can be accommodated within two interlocking continuous related to primary focus and context. The primary learning focus can be the learning which derives from the process of contracting or the learning outcomes from the studies themselves. Process-oriented contracts are concerned with the means by which learners can be empowered to have more active control over their own learning experience by setting goals, identifying and responding to problems and monitoring progress. Outcome-oriented contracts are related to the content mastered and the experiences gained or with accreditation of work-based learning and, in the case of independent study, to the accrediation of whole programmes of study. The context continuum ranges from small activities within individual classes to students' whole programmes of study.

Outcomes – part of programme

Some contributors have identified the use of learning contracts in earning academic credit towards part of a degree programme. Typically, this approach is in evidence where some form of work-based learning requires accreditation.

Process–part of programme

Where contributors have highlighted the importance of learning contracts in supporting process issues for a part of the academic programme, their use is typically related to skills development or in support of aspects of educational onal organisation, such as seminars.

Process – whole programme

The distinction between process and outcome issues is less clear where learning contracts are used for whole educational programmes. Nevertheless, contributors such as Kathy Moore have stressed the use of learning contracts in supporting the process of 'self-managed learning', in her case for the MBA Programme at Roffey Park; 'the learning contract is... about getting learners to think about the process of learning itself'.

Outcomes – whole programme

Where learning contracts are intimately associated with the accredited outcomes of whole educational programmes, contributors have concentrated more on identifying the institutional procedures governing the approval of learning contracts and the assessment of their outcomes.

Issues raised by the use of learning contracts

Most of the issues raised by the examples presented in Part Two are found in the areas of:

a) managing a process which quite clearly responds to individual needs and interests;

b) resolving the extant demands of the course with the 'negotiability' of contract learning;

c) attempting to operate within an institutional system that is culturally at variance with that implied by the use of learning contracts.

Managing scarce resources in response to individual needs

One common issue to emerge from the examples is that responding to every individual need—as implied by some learning contract approaches—can be resource-intensive. This is particularly important at the present time, given the pressure to maintain standards in the context of expanding student numbers and a declining unit of resource.

The drive towards the expansion of student intake without commensurate increases in staffing has already prompted HELs to think of ways in which teaching and learning methods must change towards enabling students to be more autonomous learners. The implementation of Credit Accumulation and Transfer Schemes, the development of approaches like the Assessment of Prior and Prior Experiential Learning to manage varying levels of intake and the move towards accelerated degree programmes, all point to a system which is becoming increasingly customer-oriented. At the same time there is also the recognition that the increased intake will exhibit a much greater diversity of background in terms of prior qualifications, age, ethnic origin and social status thus exacerbating the problem of marshalling resources in response to student need.

The irony of expansion is that responsiveness to the student as customer appears to imply a responsiveness which is being perceived as resource-intensive. If properly managed, learning contracts need not be so. Indeed, there are a number of ways in which they can make more effective use of scarce resources. Resource-intensity is often associated with attempts to introduce contracts within a management structure geared towards more traditional modes of delivery. The resource advantages of switching from teacher-to-student managed learning will accrue if ways can be found of making the institutional infrastructure correspond with the cultural imperatives of autonomous learning. The move towards learner responsibility and autonomy suggests a resource shift from teacher to learner. Students, rather than staff, will increasingly be expected to manage learning, perhaps using materials delivered more efficiently via carefully crafted packages through what in effect might be 'paper modules', provided some of the staff resources released from the routine oral delivery of information can be diverted to servicing the support structures for the process of students' learning from such materials.

A timetabling solution

The management infrastructure needs to be consistent with the varying cycles of student activity involved in contracting. Traditional didactic teaching can be accommodated in regular doses of fixed and pre-determined student-staff contact, usually, calculated on hourly-based weekly-accounted timetables. Our contributors have identified a different and more varied distribution of contact needs, with two periods of intensive activity—the preparation of plans and the assessment of achievement—interspersed with periods of intense student activity which is less dependent upon tutor contact.

One of the two intensive activities, assessment, is also intensive on traditional courses. Most students are individually assessed and the structure of the academic timetable accounts for this. It is the earlier peak of activity which attracts most concern since the traditional timetable does not, at least on an institutional basis, account for a period of negotiating and approving educational plans. Learning contracts imply a cyclical process of learning of the kind described by Kolb and his associates which can be redefined as a plan, do and review cycle. Though the planning and review/ assessment periods might be resource-intensive, the doing/

monitoring period might require less contact if students were enabled to manage their own learning. A learning contract would, in part, support that management. It would not be impossible to create an institutional infrastructure which supported, say, an 'annual' or 'semesterised' learning cycle with appropriate procedures to formalise the process. Attempting to fit the approach within traditional structures means, for example, that traditional weekly notions of contact-time are impinging negatively on the process. A switch form hourly-based, weekly-accounted staff management to case-load annual timetabling would a) recognise the peaks and troughs in tutoring student-managed learning, leaving staff with alternating busy and fallow periods consistent with the distinctive sequence of varying student needs which student managed learning implies and b) would suggest a totally different perspective from which to judge the issue of resource-intensiveness.

Availability of external resources

Contributors have also pointed to the way in which HEIs can utilised and share resources in the community. In the case of learning contracts with employees the workplace can be used as a resource for learning. The use of mentors in the shared facilitation and assessment of learning has also been identified.

The participation pay off

With a switch from traditional methods of transmission to open/distance learning methods and materials, from the traditional timetable of lectures, seminars and tutorials to more group-based activity, from teachers being the source of information to student-managed learning in libraries, workshops and the workplace, and the involvement of others such as employers in the learning process, it is conceivable that one 'participation pay off' may be a less intensive 'teaching load'. Certainly there are greater opportunities for critical dialogue. With regular contexts for monitoring and offering feedback on student progress, coupled with more devices to assist self-monitoring and self-assessment the facilitation of learning may become more resource-efficient.

Course demands and student negotiation

Contributors have consistently referred to the importance of learning contracts in increasing student ownership of what is learnt and that the degree of ownership is positively linked to the achievement of goals. Many have referred to the process of negotiation as central to the acquisition of ownership. Yet in most cases, staff are attempting to fit contract learning into an educational culture which has extant demands, where course objectives, content, timing and location are set by the institution. It should not be surprising, therefore, that contributors such as Spaull, and Hay-Smith, have identified a potential lack of understanding of the process on the part of stackholders. Drew and Lawson, admit that 'the learning contracts sits rather uneasily in the whole course structure... given that competences are specified and course work required. Using learning contracts becomes problematic where the prevailing institutional ethos supports, both culturally and structurally, a more traditional 'non-negotiable' approach to higher education.

McCarthy, however, has offered aspects of course content and process for which there may be a 'range of negotiability'. Piper and Wilson, O'Reilly, and Haris, have all indicated how, while developing specific criteria for the approval and assessment of the outcomes of contracts, alternative but equally institutionally valid course procedures such as Registration or Approvals Boards can themselves become the extant requirements for quality assurance and the maintenance of academic standards.

Institutional disjunction and the purpose of higher education

In the main, the examples offered by contributors focus attention on the implementation of a process which is culturally at variance with the prevailing hegemony. There is a disjunction between institution-centred demands and the student-centredness of contract learning. The wider debate that the use of learning contracts implies is that which concerns the purpose of an HE institution: is the institution's role one of 'Director of learning' or one of a 'Resource for Learning'?

The institution as Director of Learning perpetuates implicit and explicit assumptions of the learning process as being owned and controlled by the institution, servicing the demands of the course and the needs and interests of staff. The institution as director of learning derives its legitimacy from 'external' control over objectives, content, timing, pace, location and forms of assessment. Once choice of study, or in the case of modularised programmes, choice of combinations of study, has been made, student control over the process is largely abandoned. Little investment, by students, in the means by which learning is accomplished is permissible within this model, although, no doubt, there is a positive attachment to the ends or outcome of the process -the award. Students may be said to have an instrumental attachment to the process of learning and a passive, dependent role in that process.

The *Institution as a Resource* for Learning, by contrast, would use its human and physical resources to support the learning needs of students and other stackholders. Its purpose is cooperative, promoting a dialectical rather than didactic learning process, a shift from dependent to autonomous study, from transmission to interpretation, from the authoritarian to the democratic. The student is encouraged, in negotiation, to develop greater ownership of the objectives, content, procedures and processes of learning. Greater attachment of both the means and ends of the learning process is thus made possible for the student. The institution may be said to be encouraging a more expressive attachment to the process of learning and a more active, independent role for the student.

It is in the shift from the institution as 'Director of Learning' to the institution as a 'Resource for Learning' that the learning contract can increasingly provide the means by which responsibility and accountability in learning can be achieved and where students can demonstrate a greater expressive attachment to learning.

Future uses of learning contracts in higher education

Our discussion of the future use of learning contracts in higher education takes account of some developments already in place, some about to emerge and some which can only be envisioned. Central to the discussion is the notion that, for the use of learning contracts to be embedded in HEIs, both cultural and structural change is necessary. We take as our key issues:

a) learning contracts and modularisation;

b) learning contracts and open/distance learning;

c) the move from traditional teaching methods to tutor groups;

d) learning contracts as an overall strategy for learning;

e) learning contracts and the learning institution.

Learning contracts and modularisation

While some contributors have described the use of learning contracts within particular modular units, few have considered their use for inter-modular integration. It is an aspect of contract learning which requires further consideration.

Learning contracts within individual modules

Many of our contributors have envisioned the wider use of learning contracts on modular courses. Nicholls, in particular, in his description of a course unit at Manchester Metropolitan University suggests that

> The adoption of contracts for all course units would perhaps lead to more thought being devoted both by teachers and students to questions of coherence and progress, to consideration of the respective contributions of different units towards encouraging a wide range of competences, and to explicit attempts to plug gaps in a student's educational experience.

The logic of modularisation presents a strong case of the use of learning contracts within individual modules. 'Mix and match' schemes will mean tutors having to cope with a greater variety of students with a greater variety of experience from different feeder modules and with different intended destination modules. Learning contracts can accommodate these different start and end points, and can enable students to relate their module programmes to their distinctive needs and aspirations, providing a course experience which has, for each student, coherence and overall integrity.

Learning contracts for inter-modular use

The problems of cohort diversity and programme coherence identifiable within individual modules are still more visible on the institutional scale. Modularisation has presented institutions with both opportunities and challenges in offering students much more flexibility in the choice of course provision. Few, if any, have attempted to couple choice of units of study with the idea that students can 'negotiate their own learning programmes' nor institute a mechanism for achieving this.

All institutions are seeking ways to provide evaluation of prior educational experiences other than conventional entry qualifications and, on the basis of diagnoses, to provide flexible learning experiences for students. There are dangers, however, that in an effort to create more flexibility, modularisation may lead to a fragmented learning framework. The major issue is the extent to which, in recognising the development of cohort diversity, there can be an identifiable outcome integrity. For some, there are real concerns about learning development, progression and, most important of all, the coherent integration of the student's overall bearing experience.

Individual learning contracts for overall module integration

For the future, we may consider the creation of a systematic framework which will permit the inter-modular development of an integrated study programme based on the negotiation of learning. Rather than institutionally-determined, it will be created in the form of a democratic partnership between the student, the institution and, where relevant, employers/practitioners. This is not to deny that some core units of study may be non-negotiable. Enabling the student to provide a justification, in terms of their own aims and objectives for learning, for the integration of optional units and other forms of experiential learning would enhance student motivation and ownership of their studies. That partnership should provide procedures and mechanisms which recognise the backgrounds of a diverse student population, their programme plans, a means by which they can monitor progress, and means by which they can review their own learning. The use of a learning contract will be instrumental in this cycle of learning for inter-modular integration.

The learning contract cycle is not closed. Its iteration could occur at convenient points in the academic timetable. The implication is that the organisational infrastructure will reflect the cyclical process of learning. The creation of a learning contract would imply an institutional' planning period.

An institutional planning period

There are sound reasons for introducing a planning period for all students at the start of an institutional modular scheme. The guiding principles of such a period would include reflections on previous experience, acknowledging present capabilities and justifying the coherence of academic progression. It would represent the means by which staff and students could jointly negotiate the academic enterprise in a more democratic partnership.

For staff there would be the opportunity to:

a) explain the relevance of the units offered;

b) establish the importance of 'core' elements regarded as essential to balance, progression and professional requirements of the subject which are non-negotiable;

c) assess and accredit prior learning;

d) engage, with students, in a diagnosis of study skills and other personal transferable skills.

For students there would be the opportunity to;

a) reflect on prior learning and seek meansby which tis could be assessed;

b) examine their role/responsibility in higher education;

c) profile present capabilities in skills and knowledge;

d) set learning objectives;

e) with guidance, prepare a learning contract justifying the cohrence of their modular programme including negotiable and non-negotiable elements.

An assessment and review period

Having established such a period, institutions may wish to consider a complementary 'assessment and review period' as a completing element in the cycle with suitable systems for monitoring progress in the intervening period. The inclusion of mechanisms, in addition to conventional assessment practices, that encourage self-and peer-assessment could form appropriate adjuncts to both formative and summative assessment.

Embedding such structures into the learning environment implies alternative arrangements to those which currently exist. Many contributors, for example, have indicated alternative institutional structures to support the agreement of learning contracts, systems which permit clarification of the processes involved, and means by which the outcomes of contracts might be assessed.

Among other considerations are the extent to which the planning, monitoring and reviewing processes might be credited, given that many staff might wish to see units of knowledge acquisition as the only legitimate accreditable activity and their resourcing, given pressures towards increasing participation rates in higher education. Moreover, giving credit for the completion of planning, monitoring and review would be just recognition for the valuable learning which students would derive from the processes of planning, monitoring, self-assessment and progress review.

Learning contracts and open/distance learning

It is clear from current developments in higher education that traditional didactic teaching is giving way to more flexible open learning approaches. Certainly, such open learning is seen as providing one answer to increasing student numbers. There are possibilities, for example, for releasing constraints on space, overlapping in unit timetabling, linear development and attendance patterns.

Such a change will, however, demand more resourcefulness on the part of the learner in managing open/distances learning, If open distance learning releases institutions from some of the management of the learning process, responsibility for the individual management of that process can be enabled by the use of a learning contract. Contract learning could enable students to:

a) manage their own personal timetable;
b) engage intelligently with materials;
c) reflect on the relevance of materials; and
d) review their understanding of materials.

European open/distance learning

We have, as a consequence of the information revolution, ever more powerful means of storing, manipulating and retrieving knowledge which, in the future, will render some of the current approaches to education and training obsolete. perhaps, more importantly, with the impact of Europe 1993, involving the biggest single market comprising 340 million people, the demand for growth in higher education and the civil rights of citizens for mobility within the European Community will mean creating frameworks that facilitate access, movement and transfer.

An important new report from the Commission on Open and Distance Higher Education in the European Community, sets out the political agenda. It describes open distance learning as:

> any form of study not under the continuous or immediate supervision of tutors, but which nevertheless benefits from the planning, guidance and tuition of a tutorial organisation...Because Open Distance Learning is meant to be adaptable to the pace of the student the material is generally structured in units or modules geared to specific learning outcomes.

The presence of a strong autonomous component in Open Distance Learning is very much in keeping with the ideas current in higher education of making students more responsible for attaining their own learning objectives.

In addition to creating opportunities for students in Europe to study distance courses from abroad the Report points to potential in linking' distance teaching institutions with regional training consortia in particular for meeting training needs for local industry' and 'creating trans-European networks for training... The need fro continuing education and training is likely to intensify since, as the Report indicates:

> It is salutary to note that even if useful acknowledge has a half-life as long as ten years, intellectual capital is then depreciating at 7% /year with a corresponding reduction in the effectiveness of the work force.

Provision within institutions, therefore, of flexible entry and exit points, where participants can negotiate learning objectives and plan learning programmes of particular professional relevance, will increasingly characterise higher education in the future. The function of learning contracts to enable that process will be invaluable.

The tutorial organisation

Our vision of the use of learning contracts in the university of the future has one final component. We have noted that importance of planning, monitoring and review periods in the institutional cycle of learning. For the process to find a supportive contextual home, the current organisation of teachingwill require some adaptation, particularly when associated with open or distance learning. The Commission states:

Distance higher education is faced with the paradox that the requirement of physical attendance in order to receive tutoring and guidance would seem to violate the principle of freedom of time and place which is the hallmark of distance education. On the other hand student support services constitute an indispensable complement to packaged materials in order to ensure feedback and inter-activity.

Reorganization of the structure of student support is equally important for college-based learning. What is required is a tutorial organisation which can cope with large numbers of students and which will provide the context for feedback and inter-activity and be the institutional locus for the use of learning contracts, profiling, portfolio development, personal transferable skills development and other current innovations. In return, the development and management of learning contracts will provide a framework for constructive dialogue between students and students and between students and staff on each student's progress.

We might offer the notion of a tutor group system in place of the college-based lecture programme and in support of a resource-based system providing support for:

a) contract development and management, which would include the provision of a consistent 'home base' for students throughout the life of their programme, supporting students in th negotiation of learning contracts, engaging uncritical dialogue for reviewing the progress of learning through profiling/portfolio development;

b) personal transferable skills development, enabling it to be integrated within course delivery, developed in the main through active learning situations rather than through open learning materials;

c) experiential learning, providing opportunity for developing a shared clarity of purpose amongst different participants including employers, a focus for the process of negotiation between student, institution and employer and the review of progress from client-based project work, work experience and placement.

There is no reason, of course, to view these tutor groups as mutually exclusive. Staff development would ultimately determine the extent to which appropriate skills in facilitation would enable all functions to be incorporated in one form of group.

Learning contracts as a universal strategy for learning?

Between them, our contributors, present a catalogue of the different ways and contexts in which learning contracts are able to develop different aspects of student capability. It is our view that the essential feature of the learning contract which enables this to happen is the obligation it places on students to be accountable as well as responsible for their own learning. Learning contracts have to be negotiated and justified at their outset and demonstrated and reviewed at their completion. Each of these activities involves dialogue – with other students, tutors and the relevant academic and/or vocational 'field'. Not only does this dialogue develop useful personal skills and qualities, it also extends students' understanding of the effectiveness and relevance of their own learning. Programmes of study which allow students to receive and regurgitate information – whether passively or actively – can easily allow students to avoid addressing these issues. A well-managed learning contract approach, with suitable tutorial support for students, ensures that students own and understand as well as merely cover the content of their programmes. It focuses on the development of the student's overall capability—the ability to be responsible and accountable for their own continuing personal and professional development.

Learning contracts can be used for small-scale activities as well as whole student programmes. They can also be used for a succession of small-scale activities within a negotiated contract covering a whole programme. Learning contracts are appropriate for students at any level because they make the student's starting point the basis for the student's programme, and for any aspirations whether academic, personal or vocational. By taking students from their starting levels towards their aspirations, learning contracts focus on students making progress in their chosen field. They are suitable for any level and for a wider variety of learning locations than is normally provided within the classroom. It could be argued that they have a universal application.

An approach to education which develops students' personal qualities and skills, promotes understanding of key concepts and the relevance of what is learned, focuses on helping students take themselves forward and is almost universally applicable, deserves serious consideration. Students reared on receptive learning may not readily take to it, be convinced of its merits or, more significantly, may lack the confidence to commit themselves to being responsible for their programmes. If students complete a succession of contracts, beginning with small-scale or easily manageable activities and each one builds on the experience of its predecessors, student sophistication in both the process and content of their contracts will be enhanced.

In we bring all of the aforementioned together and show how a succession of student negotiated contracts can lead to student sophistication in a range of high level skills within the context of the student's specialised field of academic and /or vocational interest. The Learning Contract Capitality Spiral begins with the student's existing level of capability and progresses through five activities, each of which enables students to develop different aspects of their capability.

With each successive contract, students become more sophisticated in each activity, and are able to progress their studies in more complex situations and with a greater depth of understanding. The succession of contracts represents a spiral of escalating student capability and student commitment as their sense of ownership of the direction of study is integrated with feelings of power derived from achievement legitimately attributable to their own efforts and initiative

Learning contracts and the learning institution

We envisage the possibility of creating an institutional framework which supports a learning process based on successive student experience of planning, negotiating monitoring and demonstrating and reflecting on their own learning whether on independent study programmes, modular schemes, using open learning materials or learning from a variety of work-based experiences. At the heart of this iterative process based on the construction and revision of learning contracts is the vision of an institution which is a resource for learning – a learning institution where participantse, including school leavers, those returning to learn and those seeking professional updating can jointly negotiate their higher education programme by entering and exiting at points which equate to their accredited learning.

The learning institution will prsovide students with:

a) support for lifelong learning;

b) access to expertise;

c) access to specialist resources;

d) opportunities for dialogue and peer support;

e) quality assurance and accreditation.

The learning contract, as a core enabling device in the learning institution will ensure:

a) a means of providing vigour, public credibility and accountability;

b) a means of maximising access and responding to an increasing and increasingly varied intake;

c) a means of negotiating access to resources and expertise; and

d) the creation of a cooperative, lifelong learning framework.

Such a scenario requires cultural and structural change in higher education. It challenges the traditional role of higher education as the controller of what students learn and of the intellectual capital of the nation in favour of one in which higher education institutions are as open to user needs as public libraries, providing expertise, specialist resources, quality assurance and tutorial support for learners of all kinds taking responsibility and being accountable for their own learning. Radical change is coming. Given the combined efforts of a number of pioneering academic staff in institutions throughout the UK, some of whom have contributed to this book, we are certain that the learning contract will play its part in this major paradigm shift.

12

Learning Higher Education and Interactive Videodisc

The issue of visual computing and education is a very significant one. I would like to organize my remarks today in the following manner. In order to see what we are doing it is important to have a historical overview, however brief and general time will allow us today. I would also like to spend some time discussing MIT's Project Athena as it relates to this topic. And lastly, and I think most importantly, just what are the implications of visual, computer distributed Higher Education?

Paradigms

Pre-history

The original title of this talk was Higher Education and Interactive Videodisc. But let's postpone the present for the time being. Visualize if you will, prehistory. The most intense topic for Pleistocene man is "Higher Education and the Campfire". The new light emitting technology of the campfire is having a profound effect on learning. Its providing heat and meat never tasted better. It gives off light far into the darkness of night. Keeping away predators. Everyone gathers around, discussing the fire, improving it a bit, starring into the flames, exchanging stories. The heat and safety of the fire allow a little wonder, allow a relaxed look at the stars. Could the stars be distant fires? Beginning astronomy is now in session.

Greek

Its 516 BC. Mnemosyne is the Greek goddess of Memory. Simonides is inventing the art of memory. He is equating the methods of poetry and painting. He is teaching that painting, poetry and memory are intense visualization. In order to demonstrate this space are designed with visual details that elicit lines of poetry to the initiated. Carefully placed windows and small openings direct light into these details. The topic of the day is Higher Education and Memory Theater. Could it be that the mind has an eye? Do we remember the face and forget the name? Can objects be the repository of memory? Noumenon, phenomenon?

Renaissance

The talk is of Higher Education and the Printing Press. Knowledge has been stock piled in various libraries and monasteries where scholars dispense information to the elect. The illuminated texts are carefully handmade to create the illusion that light is coming from the page. The printing press has just been invented. Knowledge can be bought and traded like any other commodity. And if you can't read, well then just look at the pictures. Every picture tells a story, doesn't it? Now the great teaching can go home with you, the are mass produced. The teacher/student relationship is changed. No single teacher can have read all the books. So education is distributed, it is "universitized", codified filtered through institutions.

Television

We know we are a long way from Higher Education and the Campfire. We know longer intuit directly from nature. The memory theaters of Simonides are pale marble monuments. Picture books are usually for art collections, travel, and fads. The fire has been replaced by television. Television, to see at a distance. What ever is far away is close up. What ever is too close can be made to seem far way. Pictures are literally in the air. We are entertained. Endlessly fascinated by this notion of images produced by light. If we choose we can look at 1917 in motion or the 10th century in still images. We can see the aberration of black and white history, that brief period from the invention of photograph in 1840 to the mid-twentieth century when color returned to images. And we can see advertising. We can see all about ourselves.

Computers

We can remember everything as well. We have computers. Powerful devices capable of astounding feats of memorization and organization. Electronic brains powerful enough to guide men to the moon and take pictures of distant planets. Enormous data banks that can be linked together to create electronic libraries more vast and encompassing than any single university. The computer began as a number as a number processing machine. It has now become a text or word processing machine as well.

The visual workstation

What could happen if we combined optical, light based visual memory and the computer?

John Berger in Our Hearts, Our Faces, Brief as Photos, reminds us that "The visible has been and still is the principal source of information about the world. Through the visible one orientates one-self. Even perceptions coming from other senses are often translated into visual terms.. It is thanks to the visible that one recognizes space as a precondition for physical existence. The visible brings the world to us. But at the same time it reminds us ceaselessly that it is a world in which we risk to be lost. The visible with its space also takes the world away from us. Nothing is more two-faced. What sort of a visual metaphor for this two faced condition that let's light in but also can block it out?

Windows

The window. Or better yet a series of windows, each with its own kind of vision, that can be studied individually or correlated by peering through simultaneously. The first window is for dialog. It allows the explorer to engage a search. We can call it a menu because it provides choices of action.

The next window is a picture, it is the representational visual memory. Then a text window for reference and entering information into the system from the keyboard. There is a graphics window, used for annotation, animation. These windows may be shifted deleted, re-ordered, sized, moved, and iconified. At project Athena this is called X Window system. Developed at MIT in conjunction with Digital Equipment Corporation, the X Window is a network-transparent portable window system that allows applications to work seamlessly across various machine architectures and network. It is a public domain program originally written for Berkeley 4.2 UNIX. More than 70 computer companies and software developers have adopted X as their standard window manager. Among them IBM Sony, Hewlett Packard, and Date General.

Visual memory

Let's concentrate our attention on the picture window. How can picture data be entered into this window? It must come from a source that the computer can easily accommodate. It must be electric. In the late 19th Century amazing changes began to take place. Changes we take for granted as we enter the 21st Century. Skyscrapers, elevators, the fountain pen, zippers, the typewriter, airplanes, the electric light all appeared as if by magic. The conversion of sound to electricity to sound again created the telephone, the radio and the phonograph. Thomas Edison foresaw the phonograph as an instrument that would change mass education by bringing the voices of the great teachers to the ordinary person. In 1894 he invented the Kinetoscope, the motion picture projector, which he felt would replace textbooks. It was too expensive for education and instead became the premier instrument of entertainment. Edison actually wanted to combine the phonograph and the movie very early in his research "in the hope of developing something that woruld do for the eye what the phonograph did for the ear. Motion picture records were never pursued, however. Instead, in 1926, sound was added to film.

Happening almost simultaneously with the developments in film, research on electronic image making was being undertaken by inventors like Philo Farnworth and Vladimir Zworykin. They were inventing television. The main concentration was on cameras, cathode ray tubes, and methods of transmission which have given us our modern television broadcast systems. John Logggie Baird, a Scotsman, was working in a divergent mode. He was attempting to make television pictures by mechanical means. He worked on the idea of inscribing television signals on a waxed phonograph record and he called it Phonovision. This was in 1926. In 1935 he tried unsuccessfully to market Phonovision. Developments in broadcast television were simply too powerful and his vision of prerecorded television for the home or cinema was premature. It was no until 1963, after the far reaching revolution in television, magnetic tape recording, and integrated circuitry that the notion of videodisc re-emerged as a medium of interest. The random access nature of the non-linear disc was a compatible design for the computer. Between 1969 and 1972 Westinghouse Learning Corporation created a magnetic videodisc system for the University of Wisconsin Medical Center Library. Images could be sent other hospitals via telephone. Magnetic media was not the solution.

Laser memory

A new kind of design was needed, something that was faster, more accurate, and had less distortion. In 1916 Albert Einstein decided that he would spend the rest of his life attempting to understand the nature of light. His research led to his theories of quantum radiation. This work was fundamental to the invention of the LASER The LASER is a device that excites electrons into emitting photons, of the same wavelength. It then pumps those photons into an intense amplified beam. The power of a million campfires. By focusing the laser onto a tiny spot on a light sensitive material it can record and read microscopic holes, impressions that can be decoded into analog pictures. The storage density of this new medium, the laser videodisc is quite amazing On one side of a 12 inch disc 54,000 individual pictures can be stored along with stereo audio and digital data. The laser can access a single frame in 1.5 seconds or less. CD-ROM, or Compact Disc Read Only Memory is another kind of disc that is only 4.7 inches in diameter but can store 600 megabytes of digital information or the equivalent of 200,000 pages of typed text. Entire encylopedias have been placed on a single disc. Compact Disc Interactive or CD-I is yet another innovation that proposes to eliminate the need for computer by placing operating and applications information right on the disc as well as still photos, music, speech, graphics and computer programmes.

Digital video

To bring our historical journey to the present, on March 3 of this year, GE/RCA announced the creation of a full motion digital compact disc. In other words a videodisc with the same capacity as the larger analog disc but only 4.7 inches in diameter. This announcement is starting for another reason. The environement of the computer is digital. This new development fully realizes the notion of video becoming computer compatible. It means an inexpensive digital video player can be connected directly to a computer with very little trouble. It means in effect that all video will be computer compatible. It means that anything that can be placed before a video camera can be accessed by computer. It means that the visual world has a home in the computer. And the computer is inherently a learning machine.

Learning machines

I say the computer is a learning machine rather than a teaching machine. Learning is a relational situation. We connect pieces of information to form a thought. We each have a special way of connecting information. The computer has the unique ability to imitate this mental process. Any student who moves from only listening to clsasroom lectures to doing personal research has crossed into learning rather than being taught.

The computer is a memory theater. It stores and displays information and is capable of being organized in an infinite number ways it remembers whatever is placed in it and can associate data in an enormous number of patterns. Anyone familiar with a word processor knows how fragments of text can be endlessly modified and rearranged and reassociated. Nothing is fixed until the computer activates the printing press.

Project althena

In an effort to better understand the effect of computers on learning MIT, in 1983, created Project Athena. This five year program was established to explore new, innovated uses of computing in the MIT curriculum. MIT faculty were concerned that mostly graduate level students had access to computing power. In order to integrate computers into the undergraduate program a large scale effort would be needed, both technically and financially. Digital Equipment Corporation and International Business Machines agreed to provide MIT with approximately 50 million dollars worth of hardware, software, technical support staff, maintenance, and networking. In addition, MIT has raised an additional 20 million dollors for curriculum development. Twice a year faculty are invited to submit proposals to review committees. At end of 1986, 111 projects were funded. It has become a large scale laboratory to see how computing will fit into universities in the future. Its goal is a networkable coherence of machines and software. For instance UNIX has been chosen as the operating system and X windows, developed by DEC has become the chosen interface. Workstations have been deployed in public work areas, living groups, laboratories, libraries, departmental areas, and special curriculum sights. By the end of next year 1500 workstations will be in place. This fall among these workstations will be a cluster of very specialized machines, Visual Courseware machines. In the fall of 1986, the scholars workstations will be demonstrating the combination of X windows, full motion color videodisc, cable television, digital audio, high resolution graphics, and CD-

ROM, laser printers, and the very powerful 32 bit computers themselves.

There are ten courses currently under development :

French, Spanish, German, and Japanese language; Cellular Biology, Mechanical Engineering, Nueroantomy of the human brain; and three Architecture Projects, produced through the newly established Visual Courseware Laboratory of Project Athena, these pilot projects represent an environmental approach to learning. The student is interfaced with a multi-media networks station that is very much like a gateway into a new world of learning.

Image learning

In a world where pictures are literally in the air, the use of electronic imagery as a visualization tool seems obvious. What is not so obvious is how to grasp the tool. The use of new optical information storage technologies like laser disc acted upon by powerful personal scale computing machines makes possible enormous leaps in information correlation. Connected into interactive networks, these learning stations create a new model for higher education. All educational experience has a visual component, from physics to literature the mind's eye is at work. How a student visualizes and associates research becomes key to realizing the potentials of the new technologies. By accessing libraries of text, audio, and computer graphics the student begins a journey into the collective memory. Image learning virtually means assuming the role of the artist, the person of integral awareness who creatively looks, literally, for meaning. Each of us has a special way of learning which can be coded into the memory of the computer. Each interaction with data bases can be noted and refined so that no subject is beyond a student's abilities. An art history interest can be applied to physics. You can comprehend whatever you are curious about because it can be shown to you the way you understand things. Everything is interesting, the world is open again to fresh insight.

Questions

Who will control this process? Who will decide content and structure? Who will have access? Is visual simulation a healthy idea? What will the inevitablemarriage of education and entertainment mean? What will it mean to create knowledge gates that are independent of the campus and the institution? What role will the traditional teacher have in this environment? What will holographic visual memories mean?

These will be the questions for the next twenty years. The educator of today has responsibilities on a planetary scale. The seemingly innocuous introduction of something like interactive videodisc into education suddenly tips a cultural scale. Interactive videodise is just a late twentieth century electronic campfire. It will allow a long gaze into our collective visual memories. What we see may astound us. The window can close though. This is a two-faced world. While the window is open teachers must be responsible for what is seen. There is one basic factor that separates the educator from anyone else using these new light-based technologies and that is simple-love of subject. The message of this new electronic learning environment is not the importance of machines or the possibility of a Science of Learning. It is the time of the teacher.

Visual language learning

The Visual Courseware Group at Project Athena is made up of creative individuals interested in visual language with a passion for details about learning technologies. By bringing this kind of sensitivity into a technological environment we hope to create a visionary computer environment, literally and mataphorically, for the students. What will this mean for the teaching of Mechanical Engineering, Neuroanatomy, Biology? Certainly the architecture projects will already have an understanding of this process. We are discovering very quickly, however, that the language projects are vital to creating this visionary paradigm. Language is environmental. It is not only concerned with words but with gesture, sound, body language and facial expression. It is the dynamic fluid of cultural understanding and to this end all languages are in harmony. This is now a very small, fragile world that can not risk misunderstanding. The language educator is the best hope for revealing all the fundamental potentials of the new learning technologies.

13

Negotiating in Higher Institutional Context

As we reflect on some of the critical issues raised by the use of learning contracts for independent study, it is perhaps worth remembering the distinctive features of the UEL experience:

a) that it has been a cross-institutional endeavour, not confined to one Faculty or one course;

b) that the student devises the whole programme of study; it is not a matter of choosing from a menu of modules, nor of doing a pre-set course by distance learning;

c) that the student intake has been predominantly mature and non-traditional in terms of social background and educational qualifications.

In its beginnings, independent study at UEL, was an innovative response to the introduction of a new qualification, the Diploma in Higher Education (DipHE). Nationally, the DipHE was envisaged as offering a general education with some specialist elements, either as an award in its own right or as a vehicle for entry to teacher training or a specialist degree course. At NELP it was taken further, as an opportunity to create an alternative to the university-dominated model of academic courses which would be more appropriate to the needs of the community in which the Polytechnic was situated - in East End boroughs with some of the lowest take-up rates of higher education in the country. As a planning paper for the DipHE put it in 1972.

An important principle of NELP policy is to design courses to cater for the needs of prospective students rather than to seek students to fit the courses that NELP would like to run.

The project of independent study was thus inextricably linked to the whole question of what the institution was about—educationally, socially and, indeed, politically. It is not surprising that the subsequent history is both turbulent and complex.

In this chapter, I would like to reflect on a few key issues-to do with the organisation and resourcing of independent study in the University; the type of learning contract we use; the educational models which staff have brought to independent study; and the experience of different types of student. I shall aim to be brief and provocative, but to give some sense of the tensions leading to a radical reorganisation or independent study in the University over the last year. I offer a personal view, not an official history.

Issues of organisation and resources

Independent Study was conceived originally as an integral part of educational provision in the institution. The small circle represents the School for Independent Study (SIS), which was established as a central unit to foster the development of independent study throughout the University and to provide central support for student programmes. It probably did not help that for much of its existence SIS was located in a satellite building of the University some distance from the main teaching sites.

Two keys issues here, then, are:

a) the importance of establishing joint ownership or partnership, and embodying that in organisational arrangements;

b) the dangers of marginalisation of an innovation.

In institutional politics, the issue of ownership is closely linked to the issue of resources. Despite strenuous efforts by the Head of SIS in the 1980s to establish an economy where resources followed students around the institution, a transparent system of accounting was never achieved. Where departments did take independent study students, there was a more or less acute suspicion they were not being properly paid for the supervision and resources they provided. So long as independent study could run on marginal costs, soaking up 'spare' resources, the situation was more or less tolerated, but as it grew to become about 10 per cent of the total student population at the end of the 1980s, and as departments were under greater pressure on their resourcing, it became increasingly difficult to obtain access for students to specialist supervisors and resources. For a mode of study which depends on the notion of the institution as an open resource for learning, this was a serious problem.

The type of learning contract

The method chosen to enable students to construct programmes of study related to their own needs and interests was the learning contract. At various times, contracts have been called statements, proposals of study, learning plans and even, for a short while, learning contracts.

Because students are writing a programme for one or two years, the learning contracts are quite substantial, averaging 15 to 20 pages. The format of contracts differs between different awards, though the sections in give a reasonable idea of their structure.

The first column illustrates the formal language we lend to use as academics. The second column is in plainer language and, though it is less intellectual looking, it helps even MA and MSc students to understand the logical structure of the contract.

1. Relevant prior learning	Where have I been?
2. Present knowledge and skills	Where am I now?
3. Learning aims andobjectives	Where do I want to go next?
4. Proposed programme of study	How will I get there?
5. Resource implications	What will I need to help me?
6. Assessdment scheme	How will show I have reached my goals?

Sections of a learning contract of independent study at UEL.

A student typically has one term to write the contract, which means in practice about eight weeks. The drafting and re-drafting are done with support in a central studies tutor group and, where possible, in dialogue with a potential specialist supervisor. The final contract is subject to rigorous scrutiny by external and internal readers who make recommendations to a formally constituted Registration Board which decides whether the contract is acceptable or not. The student has the opportunity halfway through the programme of study formally to register any modifications made to the original contract at what we call the assessment entry point.

For some students, producing the contract can be a burdensome chore; they feel they know what they want to do and just want to get on with it. For others, the contract can become an end in itself, with Section I expanding to 30 pages or more. The latter is perhaps more typical of first year students, for whom entry to higher education signals a time of transformation in their lives. The former students may be at a stage of their lives where a more instrumental approach to learning is appropriate. Part of the skill of a central tutor in helping students to write their contract is to recognise and to accommodate quite different expectations of education which learners bring to the institution.

Even trickier is helping the student get to a constructive balance between personal expectations and what the

University can offer to meet them. It often helps in such situations if the tutor can offer a model which helps the learner recognise and articulate the process they are going through what Virginia Griffin has called 'Naming the Processes'.

Three models for independent study

When I first joined the School for independent Study in 1981, I was surprised, having studied philosophy of science, to find myself in a community of practising Popperians. That is, students were encouraged to think of their learning as analogous to scientific discovery, where the good scientist, according to Karl Popper proceeds by making bold hypotheses then seeking evidence to refute them. This is a useful model in many ways—it has a strong element of self-criticality built in to it; it offers a reasonable rationale for problem-based learning; and it captures for the learning process some of the allure of scientific method, that great legitimator of knowledge claims. It is possible to consider the learning contract itself as a form of hypothesis, to be tested against the actual outcomes of the learning programme.

Fairly soon after my arrival at SIS, I discovered a second learning model on offer. This one was derived from humanistic psychology— indeed, from another Carl, in this case Carl Rogers. This model might be typified as student-centred and concerned with education as a process of personal development. Derived from a therapeutic model, the student-centred approach defines a very supportive role for the tutor as a facilitator of learning, though it is not so clear where the critical edge resides.

My own favoured model is based on the experiential learning cycle usually associated with David Kolb. Kolb developed a model of learning which goes beyond the purely conceptual domain generally valorised in higher education, and beyond the theory-practice relaltionship of professional education, to encompass planning and critical reflection as integral phases of a cycle of learning. We can see in this model that for a learner to own the learning fully, he or she should be involved in planning that learning-in the case of independent study, in negotiating the learning contract.

We have also made critical reflection an explicit element of the learning process, requiring each student on the undergraduate programmes to produce a critical review of their learning as part of their assessment.

However, the broader point to note is how the student's cycle of learning relates to the institutional processes which legitimate it for the award of a Diploma, Degree or Masters.

While I take a fairly pragmatic view of models, seeing advantages and disadvantages with the three I have outlined here, some colleagues take a much more committed line, to the extent that SIS nearly disintegrated several times from the tensions generated between proponents of the different models.

The types of student

Independent Study attracts different types of learner with different expectations and approaches. In a study of past students, John Stephenson identified six categories of student orientation. However, I would like to use a simpler typification to point to different strategies of recruitment with different levels of risk.

One strategy for independent study is to take high-flyers only. These are students that staff generally love to have. It is like having a research asistant. Another strategy is to focus on professional education. In my experience, independent study works particularly well with part-time students working on topics arising from their professional situation. A third strategy is to operate a broad access route for non-traditional students into higher education. This is the route SIS took and, in retrospect, we can see that it was a high-risk strategy.

When it worked, it produced wonderful results. A student who entered the DipHE programme with low self-esteem and a history of educational failure could emerge after three years of critical challenge in a supportive environment with a good honours degree. In current jargon, the process offers a lot of 'value-added'.

However, SIS was carrying too much innovation. We were doing access before the great growth of access in the 1980s; we were doing the Accreditation of Prior Experiential Learning (APEL), for direct entry to our one-year degree before most people had heard of it; we were operating with mature entrants without A-levels long before the University put in place a system of learning support; we were well down the road from norm-referenced assessment for some time before there was a broader debate about criterion-referencing and outcomes of learning.

By 1990, SIS appeared very successful externally, but the tensions between SIS and the rest of the institution, the tensions between different approaches within the School and a rapid catching-up by the world outside together set the scene for a critical report by Her Majesty's Inspectors following their visit to the School in November, 1990.

Independent study at UEL in the 1990s

The visit by HMI proved to be a catalyst for change in independent study at UEL, with a radical re-organisation of course operation and a re-structuring of the undergraduate programmes. At the same time, the University is embarking on a move towards more flexible delivery of programmes, which entails greater compatibility of independent study with the modular programmes and with the Credit Accumulation and Transfer Scheme. The key changes for independent study are summarised below:

Reorganisation

We have returned to the original vision, with a small Coordinating Unit for Independent Study and the majority of SIS staff developed to the six Faculties of the University. The intention is to foster ownership of independent study by the Faculties, in order to ensure student access to appropriate specialist supervision and resources.

There are also two College-based licensing arrangements for the undergraduate programme, making eight semi-autonomous course operations in all. I have to say that this produces no more problems than the devolution of the Soviet Union, though on a mercifully smaller scale.

Restructuring

Before HMI visited, we were already rationalising the portfolio of DipHE and Degree courses we had developed over the years. In their place we have put a coherent set of staged awards. Additionally we have paid particular attention to lightening up the key quality control points of Admissions, Registration of plans and Assessment, with on-going development of the criteria to guide judgements at each point.

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Distance Education

The description of distance education as a form of industrialized education will, among other things, be criticized as public opinion is a still influenced by anti-technical, or more generally, anti-industrial emotions which emerged in the context of the critique of our modern culture. 'The gospel of humanity cannot be separated from the critique of modern culture,' summarized Litt. In the second part of the nineteenth century critics of culture such as Ruskin, Hildebrandt, Nietzsche and Langbehn opposed industrialization, arguing mainly that it mechanizes and factionalizes man.

Hans Scheuerl has described the damage done to man by industrialization as set forth by critics of culture. According to these critics there is a fear that 'original individuality will decline in a mass culture' and will be summarized to mere functional efficiency, that 'the imitation, the mass production will make the deeper layers of soul waste away', that stressing external, values will result in the loss of interior values, that the materialistic attitude towards life will alienate man from spiritual contents and their requirements. Altogether, these critics believed that 'the originally wholesome nature' of man is not enriched by the artificiality of civilizatory achievements but 'alienated, endangered and suffocated'. These attacks of the critics of culture have become especially important as their fundamental attitude was mediated by the youth and school reform movements and had strong effects on the theory and practice of education in the first half of our country. The attitude of several generations of teachers towards technical achievements, the mechanization of instruction, and, therefore, towards distance education as well was influenced by their critique of culture.

In spite of this, the return to the critique of culture in order to find out the reasons for the reservations of present-day educationists to distance education seems to be a little inadequate at first glance. First of all, critical discussion of distance education has not yet started on a scientific level. And secondly, we have learnt that the opposition towards other forms of industrialized education, such as programmed learning and cybernetic pedagogy, has been less strong than was expected. In the meantime, one is often prepared to view industrialization as an irreversible process. Nevertheless, it must still be supposed that the attitude of former critics of culture was handed down by the movement of neohumanistic education and is still potent in the educational world of today, even if it is mainly found below the level of scientific discussion. This may be the reason for the widespread sacepticism, lack of interest and even disdain for distance education. As evidence for this are the critics who readily concede that industrialization is, indeed, an irrevocable development, but at the same time consider it dangerous and disastrous. Judgements of this kind can be heard from modern critics of culture in the conservative camp to the anti-authoritarian and progressive Marxist camp - where they are growing in numbers. Progressive Marxist examples are mainly the attacks on the cultural industry by Theodor W. Adorno, on the consciousness industry by Hans Magnus Enzensberger and Herbert Marcuse's description of the consequences of advanced industrialization on man.

There is no doubt that many of the arguments set forth by critics of culture in three different historical periods apply also to industrialized education. One is, for instance in line with the critics of culture of the second part of the nineteenth century when saying that the original individuality of the teacher and also of the students cannot express itself and is even lost over long periods of the teaching-learning process because of the use of technical media and of fixed goals and procedures of instruction. Teachers and students do not meet as fully developed individuals, but only as reduced and specialized functionaries. Distance education produces neither funny teaching characters nor notoriously annoying types of students, as is often the case in face-to-face instruction. The systems of distance education are, it is true, 'standardized in order to raise their functionality', and 'production in series', 'mechanization', and 'functionalization' and 'functionalization' are their important structural traits. Finally, it should be mentioned that the motivation of many distant students derives from a 'materialistic attitude towards life' - that,is, that they strive to improve their conditions of life by obtaining higher qualifications. While this attitude may be a general one in our time, it seems, however, to be typical in a special sense for distant students.

When we consider new arguments - for instance, those of Jochen Kaltschmid, who has proved again in a profound analysis that 'the apparatus, the technicalization, mechanization, division of labour and organization' are all elements of the process of rationalization which shape the existence of man, and that the consequences of this rationalization are that our world is 'dominated by purposes', that we lose our 'inwardness', the 'immediacy of life' and the unity of our psychological faculties - then, of course, we have to see that these consequences, indeed, are very likely to be reinforced by industrialized education. In fact, its rationalized systems of teaching and learning are, as we have seen, structured in such a way that the purposes - the defined teaching goals - are achieved in the best way, the 'inwardness' of the students and the teachers, which is normally preserved by their personal interaction, is more or less lost by the objectivation of teaching behaviour, the splitting up of teaching and learning functions, and by the use of technical media. Also, the 'closeness to life' of instruction is, naturally, reduced a great deal.Teachers and students are no longer involved as whole human beings. And the unity of our psychic faculties is broken up.

There are also many current argument about the incompatibility of technical developments and education which are often emotive and relate to the concept of instrialized education, as this form of education is - as we have shown - a result of the general process technicalizing of society. Ludwig Heieck has discussed some of these arguments. According to him, education gives way to the functionalist thinking in terms of expediency in our technical age and abandons man. He says: 'Education derives from history. It is determined by the view that man is a historic being. Technical progress, however, is a historic. Instruction and education, therefore, have not participated in technical progress as they have felt threatened by it'. And he concludes : 'If man abandons himself to the world of materialistic objects, if he delivers his humanity to the functionality of set purposes-then he dehumanizes himself'.

If this treatise shows that distance education has developed so to speak unnoticeably—as industrialized education during the last 120 years, and if, over and above, it is maintained that this model of education will be of great importance for tackling important educational tasks at present and in the future, then it is necessary to comment on the reservations voiced by those critics of culture as they would otherwise underline that such a concept will be questionable, if not dangerous. The problem cannot be solved in the theoretical framework used so far in other chapters of this book. We have to face the same situation which was characterized by Paul Heimann, when he defended his contention that 'film, radio, and television are the powerful educational institutions of the present'. The objections raised to their educational use in the past also apply top distance education, especially when it employs such mass media. According to Heimann, these critics were afraid of 'the furtherance of a receptive learning behaviour, an educational and instructional impressionism, the emergence of a dangerous conformism, the immobilization of creative imagination, the artificial increase of optical and acoustical stimuli, the reduction of primary experiences in favour of secondary experiences, the depersonalization, the mechanization of the relation between teacher and taught, and the leveling out of individual instruction'. Heimann emphasized that these objections must by no means be trivialized, as some of them contain important arguments of educational philosophy. On the other hand, his reflections led to the conclusion that these objections can scarcely be refuted on the level of pure educational thinking. Therefore, he offered arguments dealing with problems of intellectual history and sociology.

In this chapter a similar avenue is followed in order to invalidate possible objections of cultural critics to distance education or other forms of industrialized education. The discussion will have four different starting points. First, the interpretation of a model of the historical development of instruction is to clarify whether distance education really distinguishes itself structurally to such a great extent from traditional education that the teacher and the students are placed in an entirely new existential situation which is not in line with the general historic trend and which must be considered as a development which fundamentally fails to reach the goal of humanity. Secondly, a number of socio-cultural preconditions of distance education and developments in the history of ideas are dealt with, in order to find out whether the objections of the critics of culture remain feasible. Thirdly, it will be proved by comparing traditional instruction in the classroom with distance education that it integrates into the process of general change of social subsystems and into the present inevitable development of society, whereby many of the norms defended by the critics of culture appear to be unreal. Fourthly, distance education is interpreted in anthropological terms. It is to be expected that dealing with it in such a way will result in further general arguments for judging the objections of the critics of culture.

Historical interpretation

If we consider the context of the origin of distance education not in a concrete socio-economic, but in a more general, far-teaching sense, then a new dimension emerges for the understanding of distance education. In order to achieve this it is, however, necessary to describe some structural elements of historical forms of instruction. If we interpret sources of ancient Indian and Egyptian education their earliest forms can be characterized by the following six aspects :

1 Usually, only a few people belonging to the ruling religious and political class participated (*elitist aspect*).

2 The imparting of knowledge and skills was mostly connected to the performance of priestly functions (*sacral aspect*).

3 The instruction was connected to special forms of the domination of the teacher who exercised his power over the student (*hierarchical aspect*).

4 The instruction took place in small groups (*familial aspect*).

5 No technical medial were used (*personal aspect*).\

6 The nature of the instruction was determined by an individual teacher, a fixed place, and a fixed time (*aspect of traditional ties*).

If one relates this initial situation of instruction to our distance education today, a historical model of instruction can be constructed which shows that instruction has fundamentally changed in a development of several thousand years. The dimensions of this change can be determined by the following extreme parameters; the elitist instruction becomes egalitarian, its sacral contents and procedures become profane, the government of the teacher is substituted by the self-government of the student, the intimate group becomes a larger and less intimate group or even an anonymous mass of students, the personal interaction between teacher and students becomes mechanized and automated, and the traditional ties of instruction to a special teacher, a special place and a special time are removed.

It is evident that developments have taken place in the dimensions referred to whereby it is not necessary to consider their division into periods or their delays in certain cultural areas. The entire extent of these changes could be demonstrated on a bipolar scale. Distance education would arrive at the extremes in all cases. However, if one also assesses the present instruction in classrooms it becomes apparent that his form of education has not developed accordingly. A closer examination will show that there is a correlation between the different stages of development and the extent to which principles of industrialization have been applied in each case.

Analogously to the historical process of the democratization of political power, which passed through several stages, there was also a process of continued democratizing of political power, which passed through several stages, there was also a process of continued democratizing of teaching and learning and of knowledge. One can ever - parallel to the political development - distinguish priestly-aristocratic, bourgeois and democratic forms of teaching and learning and of knowledge. Whereas in the beginning of the cultural development only small groups handed down their knowledge, which was often kept secret, to the chosen ones, now a phase is reached in which in many countries of the world knowledge is in principle accessible by everyone, whereby traditional ethnic, religious, social and regional boundaries, which still make education privilege to many, can be surmounted - due to the availability of industrialized education. The latest and most convincing steps in this direction have been taken by the Open University in the United Kingdom. But also the extension of the TV-College in Chicago and the plans for a University of the Air in Japan must be mentioned here. Before this, distance education techniques had been used in many universities and technical colleges of the socialist countries in eastern Europe in order to enable workers to raise their qualification by acquiring a higher education while working for a living.

Consequently, in many countries educational politicians consider distance education as a means for equalizing educational opportunities. Such a way of thinking, it is true, overlooks the enormous socio-cultural barriers on the way to education and surely underestimates the real difficulties. Nevertheless, it must be admitted that distance education provides at least necessary technical and organizational preconditions for a universal admission to continued and higher education. An analysis of statistics about distance education reveals that millions of distant students do indeed profit from this industrialized way of education. Often enough it offers them the only way towards the desired education as all other ways are barred by lack of funds or by other circumstances.

Comparison with the conditions under which face-to-face-instruction takes place in the schools of the Federal Republic of Germany as well as in those of other countries can be used to show that we are dealing with school systems organized according to class structures in which access to secondary schools and universities remains restricted, so that people continue to suffer from the inequality of educational opportunities. Ralf Dahrendorf, in his analysis of the society of the Federal Republic of Germany, has called this continued inequality a scandal.

The sacral character of instruction can be related to the fact that at the beginning of our cultural development the knowledge and skills which were handed down from one generation to the other were priestly wisdom and ritual ceremonies. Only later were the various scientific disciplines differentiated from the knowledge of the priests. In ancient Babylon the priests were physicians and teachers in one person. The Indian Veda consisted at first of hymns, teachers in one person. The Indian Veda consisted at first of hymns, prayers, wordings and proverbs which were important in sacrificial ceremonies. Only later varying systems of interpretation and research approaches developed out of them and disciplines like law, logic and dogmatics branched off.

The Egyptian priest caste also imparted collections of hymns as part of the holy literature. There again,. the scientific disciplines could emancipate themselves from mythical ideas and ritual reinforcements only later. This applied of course, to the respective instruction as well.

In the beginning, however, the forms of instruction corresponded to sacral contents. Everything we still can learn shows us that the priest-teacher was venerated by the students and that the instruction and examinations were permeated by a ceremonial solemnity. Keay reports, for instance, how the opening ceremony of the instruction of Brahmins proceeded:

> The student had to grasp with his right hand the left hand of the teacher-leaving, however, his thumb free - and to speak the words : 'Venerable Sir, recite!' In doing this he had to direct his eyes and his to the teacher. He must touch his head three time with kusa-grass and hold his breath for the space of fifteen moments. Then he had to sit down on the kusa-grass, the tips of which had to be bent in such a way that they point to the east. Then, five mystical words must be spoken. Another part of the daily ceremony was that the student embraced the feet of the teacher before and after the beginning of the instruction.

These activities were, as Keay explained, considered to be of great importance as they were to impress the students by 'their mysterious holiness'.

It is obvious that most forms of our present instruction have left those sacral origins far behind them, of course. However, on looking more carefully one can see that the process of secularization has not yet ceased everywhere. As distance education is mainly dependent on indirect interaction and communication it has, so to speak, completed its seculization. The interaction between teacher and student is objectified by rational teaching techniques and the use of technical media to such a degree that even relicts of archaic attitudes are no longer possible. In instructional face-to-face situations, however, one can still find them. In fact, rudiments of an originally sacred teaching-learning behaviour can be identified in the following circumstances:

- teachers - be they in the classroom or lecture hall - see themselves as the source of knowledge;
- the teacher dominates the students verbally in such a way that the intended dialogue between the student which is structurally similar to that of a priest in the pulpit preaching to the faithful;
- the students rise from their seats when the teacher enters or leaves the classroom;
- there are ceremonial greetings and forms of dismissal;
- the teacher - for example, in English public schools and colleges - still wears a gown which recalls a clergyman's vestments;
- the school continues to stick to certain rituals as, for instance, prayers at the beginning of the school day or hymns and other ceremonies during inauguration and graduation;
- school celebrations assume a special significance in the educational process.

These and other aspects of face-to-face instruction have been handed down by tradition. In distance education, however, this tradition is discontinued because of the technological revolution in the methodology of teaching. The original communicative stance of teachers and students is substituted by a technologically medicated interaction between the two of them. The process of secularization could, therefore, go further than in face-to-face teaching.

Under the aspect of hierarchy it can be stated that the structure of all early forms of instruction was characterized by the fact that the teacher assumed the role of the old man, the father, which was connected with wisdom, authority and power. His power derived often from the knowledge of the power bringing formulas and from his knowledge of the tradition. But above all, it was derived from the power of God. *Hieros* means 'holy'. Accordingly, a hierarchy was originally a 'holy rule'.

The students, who also waited on their teachers, were expected to respect and venerate them. Brunner reports on ancient Egyptian education how the power of the teachers resulted in the punishment of the students. The students were subjected to corporal punishments, were put in the stocks, threatened, admonished, but never praised.

In the Middle Ages the status symbol of the teacher was, typically enough, a rod, which he was to hold upright, as may be seen in contemporary pictures. Sometimes, the teacher was supported in his punishing activities by the *locates*, a school janitor who also carried a rod as a token of his dignity, but - for hierarchical reasons - with the tip facing downwards. Generally, people were of the opinion that, for instance, in the education of artisans as well as of knights, learning and serving went together. The master-servant relationship which was constituted during the training ceased only when the apprentice was formally released from this relationship after having qualified as a journeyman.

The development which started off with the student who was ruled and maltreated in the ways described comes to an end with a student who is able to identify his learning needs and who decides himself which learning goals he wishes to reach and in which way or with the university student who applies the concept of learning by researching. Both approaches orientate themselves to the model of the self-determined and self-governing student. Both of them advocate domination-free learning.

There are several reasons why distance education has developed structural approaches for forms of learning which are free from teacher dominance and the influence of the teacher's authority and why, hence, distance education would have its place at the end of this dimension:

- The increased availability and accessibility of distance education enables the learner for the first time to check through the learning material of a number of respective courses and make decisions himself when selecting one of them. The necessary qualification for doing so may still be lacking with most learners as, so far, usually other persons have decided what is to be studies and when and where the studying will take place. It can, however, be acquired with the help of systems of distance education and their counselling services.
- Normally, the teacher is not physically present when the student learns. He effects his learning only indirectly. In the same way as in the political sector the personal power of the king was objectified as soon as his personal exercising of power with the help of written documents which then led to bureaucracy, the personal interaction between teacher and student became objectified by the written word and the use of other media. Thus a scope of independence and freedom came into being, which, indeed, is used and appreciated by the students.
- The student takes over the control of the time, the frequency and the duration of his learning.
- Very often adults begin to study a course in distance education by their own free decision. In such cases, the relation between the teacher and the student is entirely different from the corresponding relationship in the traditional and institutionalized schools, where the teacher is usually the representative of the power which makes students attend the school and even controls their learning behaviour and school life.

However, the simple fact that a student learns relatively independently does not allow the conclusion that distance education already gives rise to absolutely dominance-free learning. In particular, if distance education is organized as a part of compulsory general education - as, for instance, in Australia, Canada and the United States, with the military services or in vocational training - repressive effects of those who have the power are not removed, but only distributed in another way and sublimated. Their power cannot be done away with simply by replacing face-to-face instruction by distance education.

In spite of this, it must be stressed that the objectivation of learning processes offers more scope for independent learning than instruction tied to special teachers in special situations. Above all, it enables the critical cooperation of students when instruction is evaluated even if this happens only in a representative form. When, for instance, selected students are members of the course team their influence upon the intended teaching-learning process can be increased. Here, dominance-free learning might, indeed, have more scope for its development in distance education than in face-to-face instruction. At the extreme point of this dimension one can place learners who identify their learning goal themselves, select and handle the respective system of industrialized teaching expertly, and also control the outcomes of their learning themselves.

Obviously, face-to-face instruction is still far from this extreme point, as the learning process is often not only influenced by the teachers' dominance and predilections, as A> and R. Tausch have shown so impressively in their research on the language behaviour of teachers and students, but also by traditional and institutional constraints. Criteria of repressive teaching behaviour are : corporal punishment of pupils which is still preserved in many primary schools, various forms of disciplinary action at secondary schools, and sending down from universities. In these cases the teaching-learning process is still connected to the process of disciplining the students. The double meaning of 'discipline' is, indeed, telling and applicable even today.

The social pattern of instruction was originally modelled after the social interaction in the family. Keay and Brunner agree in that in ancient times instruction began in the family on the basis of the farther-son relationship. In ancient Egypt a teacher and a student were even called father and son. If the student belonged to another family, he was, nevertheless, integrated into the teacher's family. Obviously, teaching started in the intimacy of a father-son relationship and in the form of private tuition.

Thinking in ideal types, one can assume that there was a an initial period in which private tuition dominated; for instance, when a priest introduced his successor into the procedures of secret sacral ceremonies, or when children of aristocratic families were carefully prepared for their future role in society. Our knowledge from history shows us that the subsequent periods must have been characterized by the following communication structures between teachers and students :

- group instruction;
- classroom instruction;
- large group instruction;
- instruction of mass audience.

It must be added that each period continued to exist and could even assume new importance in later periods. The changes, however, which came to pass when one period replaced the other must have been considerable, and were, obviously, caused by certain societal necessities. Brunner, for instance, reported that in ancient Egypt private tuition changed to classroom instruction as early as the beginning of the second millennium - that is, at a time when a rigid administration was established and a technically and ethically well-educated civil service was highly valued. The ability to rationalize instruction with the help of better organization is obviously a precondition for proceeding from one period to the next one.

If one asks how distance education relates to these periods, and especially distance education in the multimedia form which has developed during the last fifteen years and which has already integrated radio and television, the answer can only be that it belongs to the final period. The extreme of mass education has been reached fully. Some projects of this kind provided tuition for groups counted in tens of thousands and even a hundred thousand students - for instance, the Quadriga-Funkkolleg in the Federal Republic of Germany and the Television Course 'Introduction into Computer Science' in Japan where 700,000 students ordered the accompanying textbooks. The traditional instruction in the classroom, however, originated at a very early period. It is, strictly speaking, still closely attached to individual instruction, as classroom instruction is basically often still merely an extended and schematized individual instruction - if one disregards the many efforts to change it into group instruction. Educational theorists, who stressed the individuality of the single pupil, Locke, Rousseau, Herbart, Weniger, Bollnow and Buber may have supported this practice. The traditional teaching and learning behaviours are obviously so stable that they resist the use of technical media and the application of principles of industrialization. The communicative structure of traditional instruction in the classroom depends on limited number of students. Probably 120 students would be the largest possible number in a lecture hall. A radical new approach was needed to overcome this limitation and to make possible the instruction of large and extremely large groups of students which appeared when the general level of education had to be raised as a consequence of industrialization. Distance education is such an approach.

The archaic forms of imparting knowledge and skills could be characterized with regard to their media structure by the negative statement that they functioned without any technical medium. This means that the teachers relied on the medium of the words spoken directly to the student. Whether the teacher was a medicine man, a prophet, a shaman or a priest, he or she always communicated knowledge orally.

The oral teaching of those priest-teachers must, however, not be understood in a modern (that means more or less abstract) sense, as the words were not yet isolated from their original context. For a long time it remained part of the redeeming actions of the priest. The student experienced his speaking as his action. This means that the student not only took in the words, but was also included in the actions. This alone shows why the students had to be taken into the teacher's house. And it becomes clear why the spoken language could not just be substituted by written language at that time as this would certainly have reduced the global context of those actions.

Therefore, the spoken language of the early forms of instruction was, so to speak, only a medal *pars pro toto*. It was connected to the personality of the teacher - who was considered to be a medium himself.

Oral instruction consisted of the teacher's saying a text and the student's repeating. A comprehensive and reliable memory was required for both of them. The oral form of instruction prevailed after writing and reading had been introduced. In ancient India they were used first for commercial and trading purposes, and it took a long time before they were accepted by the teachers. Keay assumes that the tests were considered to be too holy to be handed down in writing. Teachers might have also been afraid that such written texts could be used by unauthorized persons. He reports that in India the old forms of instruction have been preserved longest and have remained unchanged. The Veda are still handed down orally today, although they are, of course, also available in print. And it is not unusual that students succeed in learning whole textbooks by heart. Even in ancient Egypt with its comparatively more advanced written culture, memorizing was the students' main activity. The teachings were all learnt by heart although they were also available in writing.

The historical development in this dimension led to an increased used of technical media and a decreased physical presence of the teacher in the teaching-learning process. Clay tablets, wax tablets, papyrus, parchments, paper and later screen, loudspeaker and computer were placed between teacher and student in order to profit from their mediating functions. Distance education, especially in its form of integrated multimedia systems, will again have to be placed at the present end of this line of development. With regard to the decreased importance of the physical presence of the teacher it is surpassed only by programmed instruction.

Traditional face-to-face instruction, however, must be classed with an earlier stage of this development, especially when the teacher and his spoken words dominate. In spite of the use of technical media such as paper, books, blackboards, pictures or even film, the basic communicative structure has not detached itself from the original oral form oi instruction.

Linking instruction to a special place is also of sacral origin. If a place had proved to be holy, because the effects of the divine power were repeated there, it became a 'special place'. This could be a grove, a grotto, but also a house or a temple. Obviously, temples were the first places where the priests accumulated wisdom, and, hence, the first places of instruction.

Just as there was - in archaic thinking - no idea of a homogeneous space, there was also no idea of a uniform time. Rather, each time had its own significance. This suggests that the early forms of instruction did not take place at fixed times in the sense of an abstract regularity. This became possible only after a first and very important phase of rationalizing in which it was considered to be possible to isolate time from its close connection to traditional places and actions which up to then were experienced as a global unit. Such an abstracting of traditional places and times became necessary when, as in ancient Egypt, one teacher had to teach several students or even larger groups of students at a time. In such a situation he was compelled to invent group instruction. It was characterized by a certain regularity and by the unity of place, time and persons. In fact, this structural unity was to become a traditional constant of all face-to-face instruction to this day.

In a second phase of rationalizing the teaching-learning process, this unity of place, time and persons disintegrated as a consequence of the application of principles of industrialization. This means that a long tradition, was discontinued. The significance of this break in the tradition of instruction may be indicated by a parallel in the arts: when dramatic presentations on the stage were substituted by dramatic presentations in film, space lost its static condition, and time its continuity. In distance education as well, the unit of place and time, constitutive of face-to-face instruction, as has been shown, ceases to exist. As the teaching is objectified in the form of course material or educational film several teachers who live far apart from each other and from the students can impart their knowledge one after the other, or even simultaneously, and in a sequence quite different from face-to-face teaching. Time as well is taken out of the context of traditional instruction. The course team can manipulate the stimuli and thus organize the presentation according to new ideas of the dramaturgy of teaching, and the students are free to develop their own learning strategy by fixing their individual times of study. Seen in this way, the break of tradition mentioned appears to be a singular event in the history of instruction.

If one assesses the described stages of development of face-to-face instruction and distance education in this sixth dimension, one cannot but see that face-to-face instruction has - on the whole - not come further than the special conditions of group instruction in ancient Egypt; that is, instruction with fixed times and places and persons. Distance education, however, developed considerably further by becoming largely independent from these ties. This opens up new perspectives which have not yet been noticed and new problems which have not yet been tackled by experts of the methodology of teaching and learning. The six lines of development show clearly that distance education is a form of instruction which reached the final stages in each dimension only because it applied principles of industrialization.

This can be specified as follows.

Distance education can be *egalitarian*, as the application of technical media overcomes some of the traditional barriers to educational opportunity. These media enable schools and universities to extend their instructional systems in such a way that every capable citizen can profit from learning if they wish - even after their school or college years. In the present historical -economic situation of highly industrialized societies the increased availability and accessibility of education thus assumes a special importance, as the further democratizing of society will increase the educational needs of all citizens considerably. More and more of them will lay claim to their human right of education. It is safe to say that such an increased demand of education can only be satisfied with the help of industrialized forms of education.

Distance education provides for instruction in which teaching and learning have been *secularized* to a high degree, as the relation between teacher and students has been isolated from its traditional social context and objectified. Teacher and students do not interact as persons in their totality, but as special teaching and learning functions which operate only in order to reach the defined goals. The numinous, however, needs the social context in order to be able to express itself.

Distance education enables and facilitates *instruction without repressive actions* in the sense that arbitrary acts of teachers - as well as of students - are cut out as technical mediation and the required division of labour have objectified instruction. If there are institutional or direct dependencies, as, for instance, in the military services and in vocational training, they will be less effective for the same reasons.

Distance education is a form of instruction which is capable of catering for great numbers of students and even *mass audiences*. Such a form of instruction would be impossible without the techniques of industrial mass production and without the help of mass media and the computer.

Distance education is principally mediated instruction. It cannot take place without the help of *technical media*. Without the mechanization of the presentation of the contents of instruction and of the feedback activities it would not be possible to start, optimize and control it.

Distance education has *cut the three bonds which ties face-to-face instruction to special places, special times and special persons*. The industrial approach of objectifying teaching and learning behaviour and of storing, transporting and reproducing it was the required precondition for this. It has made distance education the most accessible and flexible form of teaching and learning.

On the whole, and with regard to the objections of the cultural critics referred to at the beginning, the interpretation of the historic model of instruction results in the conclusion that the tradition of instruction has not been disturbed or even neutralized by the advent of industrialized education. On the contrary, it subsequently developed along the lines of development in the history of instruction. Distance education is, therefore, not something entirely new, different and strange in the world of education. It cannot be placed beside face-to-face teaching, but rather belongs to the hitherto final stage of the developments of instruction, as it has overtaken face-to-face teaching on the six lines of development, in part even considerably and distinctly. This means that distance education is, structurally speaking, ahead of face-to-face teaching. Clearly, this is the result of its industrialization.

Socio-cultural and intellectual preconditions

In this section the hypothesis to be established and substantiated is that distance education can be assigned to the era of industrialization not only because of the availability of the necessary material and technical conditions, but also because of particular socio-cultural and intellectual developments which are imperative before distance education can emerge. If in our society many adults and adolescents decide to study at a distance and not in the traditional way, if they manage to go their own way and do not depend on the traditional educational institutions, they must have qualities which distinguish them from people who lived in earlier eras., It is elucidating to analyse these qualities.

A first precondition is a particular relationship between humans and their environment. Human consciousness of the environment has changed in along process which stated with archaic-mythological ways of thinking which were gradually replaced by empirical-realistic ideas and concepts. This process was accentuated by the Renaissance and the Enlightenment as they helped to emancipate human thinking from earlier limitations. At this point it is sufficient to indicate which of these developments were important in the context of the hypothesis presented at the beginning. In the Renaissance, many people became aware for the first time that education can be also used for secular purposes. There was a growing need for the establishment of town schools and of an urban education. In the era of the Enlightenment, teaching and learning were secularized even further. People were inspired by the image of the individual who is able to change unsatisfactory conditions of society by means of reason. For the first time reason was attributed to everyone. And there was an eagerness to educate people in such a way that they learned how to use reason in an efficient way. There was a widely published popular literature in the form of moralizing periodicals and scientific treatises at that time. The enlightened individual was to become emancipated. He was to learn 'to use his reason without the guidance of anybody else'. It is evident that teaching and learning received new directions in this era. For the hypothesis mentioned it is important to note that the inner relationship between instruction and practical and useful activities was seen. Instruction assumed a rational-utilitaristic meaning. Furthermore, it is remarkable that in people's conceptions of life, vocational efficiency and success in practical life became significant - an idea which was propagated in Germany above all by the philanthropic movement. Only then did it become possible for long-term systematical work in an occupation to be valued and considered to be a 'sense of life' and 'a standard for success in one's life'. Seemingly, this is one root of the motivation for vocational qualification which was to become so important for distant students in our time.

Further preconditions have been described by David Riesman in his theory of various constants of social behaviour which can be identified in European and American societal development. According to this theory, people in pre-industrial society were tradition-directed; that is, that their observation of the external rules of behaviour was regulated and forced upon them down to the last details by customs, habits, ceremonies, rites and etiquette. When society became industrialized, however, it developed entirely new mechanisms of maintaining conformity. In childhood or adolescence, people now internalized specific principles of the desired behaviour which took effect on the whole of their lives like a steering gear. In this way, types of persons emerged who succeeded in determining their lives without a strict and obvious direction by tradition. They became inner-directed. Only now did they become able to act on their own discretion. And only in the industrialized society did they have options of doing so, as traditions fragmented, many new goals of life emerged, and conditions of life changed increasingly. Those who intended to realize the career prospects provided by the new society had to learn to take the initiative and to disentangle themselves from tradition-directedness.

Whereas the tradition directed individual could not choose between work and spare time, as their lives were regulated by tradition with regard to this as well, the inner-directed persons had the possibility of separating leisure time from working time and being able to have it at their disposal. Under the influence of the Protestant success ethic this happened increasingly in favour of useful activities, for the endeavour to be efficient, to control oneself permanently and to fight the 'demon of indolence' was religiously motivated. The then popular motto *per aspera ad astra* was internalized by the inner-directed person. This led to a striving after vocational success never known before, and partly even to a 'passionate drive to earn and gain'. At the same time the individual in the inner-directed society 'was dissociated and sheltered from others' and became, thus, isolated and more vulnerable.

The relevance of such developments for the emergence of distance education can easily be seen. It is evident that distance education would have been unthinkable in a tradition-directed society. Only the inner-directed society provided the necessary subjective preconditions for it. Every characteristic trait used by Riesman to describe the inner-directed person can also contribute to the explanation of the situation of distant students. Their decision to enrol in a distant study course is already behaviour according to their own dir=creation. Their strongest motivation is derived from vocational career prospects. When they study at a distance they dispose of their leisure time, make sacrifices, have many difficulties and are typically 'dissociated and sheltered from others'. Hence, it can be assumed that the phenomenon of the adult distant student is in accordance with an inner law of development of our culture in the era of industrialization. It influenced the student's socio-cultural and intellectual development in such a way that the motivation of millions of distant students became strong enough and their inner-directedness so stable that it caused them to stay outside of the institutions of traditional education and to commit themselves to an unorthodox way of teaching and learning.

Furthermore, it can be postulate that the individual's consciousness is also influenced by life in an industrialized society itself. These influences prepare the individual for being able to study at a distance in special ways, as can be illustrated by reference to the following four experiences :

1 the practice of dealing with people, who - in a given situation are charged with the performance of single functions only;

2 the adjustment to the permanent reception of coded information;

3 the development of attitudes towards substitute persons;

4 the orientation towards new basic personality types.

In agrarian society people live in villages and had relatively few interpersonal relations, which, however, were long-lasting, emotional and integral. No matter what the reason for their interpersonal relation was, the persons involved were expected to be dealt with as total personalities. If, for instance, someone did business with someone else, it certainly mattered whether the persons involved had a liking for each other, whether they were of the same religious faith, how they had led their lives so far, whether they enjoyed a good reputation, and so on. In such a village, a teacher, for instance, played a role which exceeded that of just teaching pupils, and which affected the adults also. His impact was a unique one. Hence, he considered no exchangeable.

Man in the industrialized society is, on the other hand, typically a town-dweller and has a such usually many interpersonal relations, which, however, are relatively short, not emotional, and used for specific purposes. Even with an unusual transaction such as the purchase of an automobile the interaction between the customer and the salesman will, as a rule, no longer be influenced by their personal likings, their religious beliefs, their political leanings, their family situations or their social status. Customer and salesman interact merely as .persons who serve in a specialized function, and the two expect from each other that this function be performed well. This means that only a small fraction of one person interacts with a small fraction of another person. Each person is fragmented and consists of many functional parts. This reduction of person can be demonstrated by referring to be example of a teacher in a city school; that is, to a teacher specializing in one or two subjects. It is true he teaches pupils, but, as a rule, he cuts out his personal background in this process. He separates official and private functions sharply. As he is reduced to someone who serves certain functions only, it is easier to imagine that he could be replaced. In comparing him to the teacher in a village school it can be seen how far this process has gone. At the same time it must be seen that the teacher in a city school is still a partner in a continued process of communicative acting which induces him to perform more functions that a teacher in a system of distance education. Considering the stages of development from the teacher in a village school to a teacher in distance education, the teacher in the city school can be classed somewhere in the middle between the extremes.

As individuals in industrial society are able to make contact with many persons in order to perform special functions, they enjoy a freedom never known before. They have disentangled themselves from old bonds which involved their emotions as well, and even the totality of their persons. Now, they are principally also ready to approach complete strangers and to communicate with them - if it is necessary for objective reasons - without doubt, a new human skill. This freedom must have been a favorable precondition for readiness to teach and to learn at a distance, if a specific educational need could not be satisfied otherwise. If the individual, in doing so, did not meet 'real' teachers and 'real students, but only persons charged with the performance of often highly specialized functions, this experience was not new to them, as it was in harmony with so many patterns of interaction which are taken for granted in industrialized societies.

Individuals in industrial society distinguish themselves from persons in pre-industrial society by their ability to receive and to work with information which is technically mediated. First of all, they are reading men. The mass media with their modern methods of production and distribution enable them to take part in the doings around them and in the world in a very specific way. As oral forms of information were more or less substituted by printed ones they got used to their presentation by technical means. At the same time, in industrial society people see and listen to many things which remained closed to them in agrarian society. A permanent supply of information from radio and television has certainly an effect on them, whereby the same information can be coded in different ways; for instance, by newspaper, radio or television.

In order to acquire the ability to study at a distance - that is, to work with mediated instruction - it may be very important that people have already gained the experience of receiving many pieces of coded information which are independent from the persons and occurrences in their immediate neighborhood. This experience is new, for pre-industrial man received typically only relatively few pieces of information, which were accidental, not coded, and connected to persons and events. The difference is obvious. Through his daily experience, industrial man has learnt to use purposeful (that is, constructed) communications which tend to be concentrated and concise. Such communications are intentional to a high degree, they avoid unnecessary repetitions, and try each time to reach the highest level of information. Evidently, experiences of this kind are better preconditions for learning at a distance than oral communication as practised nearly exclusively in agrarian societies.

The ideas and the behaviour of persons in industrial society are not formed and shaped by their interaction with their primary and secondary groups only, but also by their relations to human beings whom they know exclusively from the mass media: sports idols, film stars, politicians, scholars, authors. They learn about their developments and their life style, observe how they react to actual occurrences, and even develop a lasting attitude towards them. Thus, they are already used to dealing with 'substitute persons' and have accumulated a considerable skill in this respect. In distance education the students meet, so to speak, 'vicarious teachers' whom they know only from printed texts or aural and visual presentations. This shows again that people in an industrial society are prepared for distance education to a higher degree than those in a pre-industrial society, in which corresponding relations were established by myths, legends and rumours, and remained, therefore, vagues and uncertain.

A corresponding sociological analysis shows that industrial society has also developed new models of human development. With regard to this Richard W.Behrendt speaks of a 'change of basic types of man' which was caused by the industrialization of society. Referring to pre-industrial time, he speaks, for instance, of the ruler, the subject, the patriarch, the heroic warrior, the missionary, the wise man and the scholar. In industrial society, however, these lose their importance and are substituted by types; as, for instance, the conscious man, the emancipated man, *Homo faber*, the technically competent man and the mobile man. Further types are 'the radically organizing and manipulating man' on the one hand and 'the radically organized and manipulated man' on the other.

This change of basic types of human is a profound one, and so serious in its consequences that one can consider it a major transformation in the development of mankind. This transformation has been already dealt with in regard to its relevance in intellectual history. At this point it can be postulated that only human beings who can be classed with the basic types in industrial society are ready for teaching and learning at a distance. That is to say, if one scrutinizes these basic types, one cannot but agree that all of them have a special affinity to industrial education.

Conscious man, who tries successfully 'to become aware not only of the physical and societal world around him, but also of his inner psychic structure, which is often still unconscious', is more easily ready to assess himself and his abilities and, hence, make decisions with regard to realistic educational or training goals. In addition, he is presumably also more likely to assume responsibility for his learning. Emancipated man, 'who has disentangled himself from transcendental and traditional ties' and 'claims an original and autonomous orientation in new situations of life', is certainly more easily motivated to acquire new qualifications which he needs to adjust to such new situations. Only *Homo faber*, the type of man, 'who considers the world in all its non-transcendental aspects and also man himself as producible or at least malleable', has self confidence enough to be able to change an unsatisfactory situation of life purposefully by learning. Technically competent man is 'the archetype of an era with a relatively developed technology'. He no longer carries loads and no longer eats his bread in the sweat of his brow. Instead, he operates machines, whereby his work is mostly reduced to the control of mechanical energy. This deliverance from heavy manual work and involvement with machines and technical appliances, which save time and energy, is a good precondition for learning, and especially for dealing with technical teaching-learning systems. Mobile man, who no longer accepts being rooted for his lifetime, geographically speaking, in his native country, in the spiritual sense in this religious belief, and with respect to society in specific social strata, but claims a maximum of mobility according to his abilities and opportunities is emancipated enough to be able to learn without the local, temporal, and personal ties which are usually necessary in face-to-face instruction. Finally, the negative types of Radically organizing and manipulating man and Radically organized and manipulated man can be applied to distance education organizers and to distant students too. Here it becomes evident that industrialized education brings forth dangers of its own. The structural roots of it will be dealt with later, in the discussion of the language as a medium.

On the whole, the special aspects referred to so far facilitate the formulation of the hypothesis at the beginning of this chapter in more concrete terms: the establishment of distance education and the teaching and learning in this type of industrialized education require that a certain intellectual development and the orientation to new types of man have already taken place. The ability to detach oneself from the direct guidance of a personal teacher and from the social inspiration and pressure of the learning group, and to determine oneself the time and place of study, the amount of study, and possibly even the ways in which it is controlled, is obviously based on intellectual and socio-cultural experiences which build up enough self-confidence and self-assurance in the individual learner in such a way that he or she can, indeed, 'use reason without the guidance of anyone else'.

If such a stage is reached, a barrier has been overcome. This event can be compared with overcoming the barrier of illiteracy, as it has a similar importance in setting free intellectual potentialities and for the further development of the educational system. It may even be thought that an 'absolute threshold of culture' has been crossed.

The discussion on the intellectual and socio-cultural preconditions of distance education shows that possible reservations of the critics of culture with regard to this form of industrialized education can be modified in so far as individuals of the European-American industrial visualization are much better prepared for this form of education that people in preceding eras ever could have been. In other words: persons who teach and learn in the industrialized way are basically different human beings. In many ways - it has been possible to name only a few aspects - they are prepared and ready to benefit from abstract, objectified procedures of imparting knowledge. Furthermore, the constructed, abstract relation between teacher and student fits into z net of manifold abstract social relationships, which together form a kind of 'secondary system'. Man in industrialized societies is used to assimilating 'secondary experiences' instead of making the respective experiences himself. He does not live any longer in 'primary, organic, natural relationships, but in a produced, planned, organized, and very often manipulated world'. Those who accept the changes of man's consciousness caused by industrialization because they think that these intellectual and socio-cultural adaptations are indispensable for coping with the economical, political and cultural tasks of the future will see that the objections of the critics of culture lose some of their significance. Possibly, they will even become critics of culture the other way round, as they might think that the persistent adherence of traditional schools to preindustrial methods of teaching and learning can be considered as a serious dysfunction of the educational system - an age which is already developing structural elements of a post-industrial society.

Sociological characterization

As industrialization is at the centre of sociological research and as dealing with it has grown from the need for orientation and understanding in view of the rapid changes in our time, which were caused and accelerated exactly by this industrialization, it will be advantageous to analyse and characterize the concept of industrialized education in its sociological aspects as well.

According to Behrendt, sociology strives towards knowledge of 'generally accepted regularities of the interactive and collective behaviour of man'. As there are teachers and students in distance education as well as in face-to-face teaching who interact in special ways, the question arises where such generally accepted regularities can also be found in this particular form of instruction. In trying to answer this question, emphasis will be laid on the transition from traditional to industrialized instruction. It should be possible to characterize the social changes which have taken place in this process by means of categories of sociology more succinctly and in a more differentiated way than with categories of educational theory.

The hope for a corresponding fain in knowledge can be founded on the fact that sociology—in contrast to theory of education—has fully understood and clearly described the 'overwhelming phenomenon of technology and industrialization and their effects on social change'. Many sociologists even think that industrialization has caused such far-reaching processes of cultural change that they interpret it as the beginning of a new cultural era in the history of mankind, quite comparable in importance with former cultural eras—for instance, those of the hunting and gathering society and the agrarian society. And—still more important—the blending of technology and the production process is considered an absolute pre-condition for the continuation of the existence of mankind. In view of such a fundamental philosophy one is not surprised to learn that the industrial production of goods is considered one of the dominant shaping powers of modern society. Helmut Schelsky emphasizes that 'there is practically no sector of life of modern man in which the industrial production has not caused decisive changes of behaviour'. The analysis of distance education has shown that the educational sector has not altogether been left out of this development.

Comparing the sociological interpretation of the industrial era with the superficial and dilatory way in which, for instance, technical media are dealt with by didactical experts - to say nothing of the rationalization of instruction by planning and organizing it professionally - the different approach of the two disciplines becomes evident. Advocates of the use of technical media for instruction have only been marginal in the theory and practice of education. Educational technology has not become a central issue in the methodology of teaching and learning, and did not even get belong the beginnings. The general attitude in this matter is that technical media are merely added to traditional instruction. The insight is lacking that in view of the changes of the consciousness of modern man, the enormous impact of the teaching capacity of industrialized mass media, which so far have only been used to a small extent, and the enormous increase of teaching and training tasks—taken altogether—will make new structural forms of teaching and learning imperative. Only such an approach would correspond with the tendencies of industrialization in our present society. Only in such a way could 'cultural lag' in this sector be reduced.

The methodology of teaching and learning has, so far, not been in position to describe the social change caused by a form of instruction in which the teaching is transported to the student, and to clarify the social conditions in it which are structurally quite different. Typically, enough, when trying to explain the teacher-student relation in programmed instruction some authors refer to old, traditional patterns of instruction such as the individual instruction is substituted by industrialized instruction. This change can be identified on several levels.

Max Weber, Ferdinand Tonnies and other representatives of the older sociology have described at an early stage the changes which took place under the dominance of purposeful, rational action and as a consequence of the scientific-technical permeation of traditional social subsystems. Jurgen Habermas summarized the results of their thinking by remarking that they characterized this change with the help of pairs of concepts, for instance, *germeinschaft* and *gesellschaft*, organic and mechanical solidarity, primary and secondary relations, and traditional and bureaucratic dominion.

Accordingly, one could understand face-to-face instruction in a classroom as a traditional social subsystem; distance education, however, as a 'modern' one. Thus, distance education would be characterized as a system based on rational planning and development just like the organization of industrialized work processes. On the other hand, face-to-face instruction in the classroom would then be a system handed down by tradition which is not, or is only slightly, affected by the consequences of industrialization.

This would mean traditional instruction in a class room could be classed with the category of *gemeinschaft*, as there is a special type of closeness or familiarity between the teacher and the students as well as among the students. The persons involved are also more or less conscious of this familiarity. They approve of it and try to deepen it in order to profit from the solidarity of *Klassengemeinschaft*. It can be assumed that in such groups of students 'archaic personal relations' are fostered. According to Tonnies, the learning group in the classroom would be founded on 'a *gemeinschaft* of place and spirit'. Subjectively experienced forms of action and their traditions and rites play an important role. In each group a balance of power is developed, a process which might become so dominant that the original objectives for bringing together teacher and students temporarily lose some of their significance.

If the concept of *gemeinschaft* is applied to teaching and learning in a class room, the following categories could be subsumed: organic solidarity which can develop in direct social interaction, informal grouping, the dominance of primary social relations, and traditional forms of control, which, for instance, are mirrored in the hierarchy of principal-teacher-student.

If, one the other hand, the concept of *gesellschaft* is applied to distance teaching, the following categories help to explain its structure: mechanical solidarity—that is, the artificial solidarity which is brought about by means of technical media: formal groups—that is, the importance of the formal organization of the learning groups in individual distance study courses; secondary relations with little intensity and without familiarity of the participants, and bureaucratic control which helps to maintain the contacts between school, teachers and students.

However, be mentioned that the characterization of distance education with the help of the category 'secondary relations' does not apply to all cases. Fairs has shown that an emotional relationship can be maintained in spite of physical separation, whereby he explicitly mentions the medium of correspondence. Therefore, elements of primary group relationships can also be found in distance education - whereas, the other way round, emotional closeness can be missing even under favorable face-to-face conditions.

Jurgen Habermas has observed that Talcott Parsons' catalogue of possible alternatives of value-orientation can also be used to characterize the change of dominant attitudes as a consequence of the transition from traditional to modern society. Parsons presented the following four pairs of alternative value-orientations:

Traditional society	*Modern society*
affectivity	affective neutrality
particularism	universalism
ascription	achievement
diffuseness	specificity

With the help of this catalogue it is possible to describe more precisely the characteristic traits of industrialized education proposed so far.

The above mentioned familiarity between teacher and students in the traditional classroom indicates that affectivity plays and important role in face-to-face teaching. Indeed, there the range of emotional relationships is wide as has been shown by many empirical studies of social interaction in the class room. On the other hand, distance education is normally characterized by affective neutrality - as here the teaching and learning is not achieved by an interaction of persons, but, strictly speaking, of isolated functions. As Fairs also suggested, this does not necessarily mean that technically mediated instruction cannot be affective at all. Now and then one can find initial stages of it. Generally speaking, however, it remains safe to say that in distance education the social relations tend to be neutral.

Traditional instruction in the classroom is oriented to a particular frame of reference : a given teacher teaches a given learning group in a given temporal and locational situation. Industrialized instruction, on the other hand, disregards particular conditions of this kind, as it has a more general, if not principally universal frame of reference. Distance education tends, indeed, towards universal application.

With traditional instruction in the classroom teacher and students orientate themselves to certain ascribed qualities. Students, for instance, are 'diligent', 'good companions', 'well-behaved', 'cheeky', or 'exercise restraint'. Teachers are 'strict, but just' or 'soft'. The orientation in this dimension may become more important than the original objectives of instruction. A proof of this is the student who is the best one with regard to his school work, but plays openly a peripheral part in the dynamics of the learning group. With industrialized instruction, however, students and teachers orientate themselves exclusively towards the achievements which are assessed with the3 help of tests.

Traditional instruction can be characterized by diffuse value-orientations. The reason for this is that the norms of the learning group and the experience of 'group life' are usually not considered and, therefore, made conscious to a slight extent only. They become effective in direct social interaction in a global-holistic sense. Correspondingly, the teachers often think that precise objectives of instruction cannot be described, the methods to be chosen cannot be predicted and the sequencing of instruction cannot be fixed in advance. In contrast to this, in industrialized instruction the indirect interaction is orientated towards the specific qualities of teachers and students in the sense that these are characteristics which are of great importance for the actual achievement of the intended learning process. This tendency for clear determination corresponds with the efforts to lay down detailed definition of learning objectives and to acquire as much relevant empirical data as possible for the learning process in each case.

In an approach of his own Jurgen Habermas went beyond Max Weber, Ferdinand Tonnies and Talcott Parsons, and developed a categorization with the help of which it is possible to describe in greater detail the relevant structural changes of institutional subsystems which were caused by industrialization. He started out with Hegel's fundamental distinction between 'work' and 'interaction' in his *Phenomenology of Spirit*. Work is defined by him as 'rational acting', interaction as 'communicative acting'. By developing seven pair of categories in characterizing more closely those sectors which Tonnies called *gemeinschaft* and *gesellschaft*.

If this categorical framework is applied to instruction, the idea suggests itself that traditional face-to-face instruction could be dealt with as an institution of communicative acting, whereas industrialized instruction would be a system of rational acting using means to an end. An analysis of these two forms of instruction reveals their decisive structural differences.

Even a rough comparison shows that the two forms of instruction could, indeed, be compared with each other with the help of these seven pairs of categories. It is evident that instruction in the classroom is regulated by norms. The direct interactions of teachers and students are more or less caused by binding expectations or value concepts developed by the learning group, the school, the families and society. How much this is, indeed, the case can be seen from the fact that there are often conflicts of norms in classrooms which lead to critical intensifications of social interactions. As societal norms determine the actions of the teachers and students, their interactions are influenced by socio-cultural traditions, whereby they themselves become part of the socio-cultural life of society.

Distance education, however, is basically determined by technical rules. Most behaviour possibilities for the teachers and the students are carefully planned, calculated, formalized and standardized. Originally global and complex behaviour patterns are reduced to the setting and control of specific functions. The students are informed about the rules of the teaching-learning system, and these rules must be followed.

Instruction in the class room is a system of 'communicative acting' and uses intersubjective divided colloquial language. This language is characterized by the traits of special persons, groups of persons; places and times. Thus, in a special sense each communicative situation is experienced as being unique. Distance education, however, uses a language which is taken out of its originally associated surroundings, and is thus free of its context. The technically mediated communication of necessity remains unaffected by particular circumstance, as it addresses students everywhere.

In the classroom the communicative acting is determined by reciprocal expectations of behaviour. This means that the teacher who acts expects the students to react in a special way and vice versa. The expected reactions take place with a higher degree of probability the more the interacting persons have internalized a role consensus and the more the expected behaviour has become ritualized by habit.

In industrialized distance education the segments of interaction are constructed on the basis of conditioned prognoses and conditioned imperatives. Again, particular sequences of a global behaviour become objectified and isolated.

In face-to-face instruction the dominant mechanism of acquisition is the internalization of roles. The students live up to expectations by internalizing the norms of the group. Knowledge and skills are transported by means of this particular role identification, role taking and role performance. In distance education, however, the teaching-learning process is reduced to the learning of skills and qualifications. Every measure in this system has the sole function of achieving this goal. Communicative action and role performance are cut out.

In face-to-face instruction the social interaction helps to maintain the institution. Teachers and students are subject to external and internal control. In distance education, however, the indirect interaction is subject to the attainment of the learning goals by using means to an end.

Correspondingly, the reactions to breaches of the rules are different in the two subsystems. In face-to-face instruction, the students are punished by conventional sanctions; they fail because of the authority of the institution. In distance education, however, they fail because of lack of success; that is, they fail because of reality.

Finally, the two subsystems also differ with regard to their particular ways of 'rationalizing'. Face-to-face instruction leads to the emancipation of the student, to his individuation, and to the extension of 'dominance-free communication'. Distance education leads to an increase of effectiveness by using technical devices.

In the result of this comparison are summarized.

On the basis of this sociological analysis the following definition of distance education can be give:

> *Distance education is a system of rational actions for the imparting of knowledge, skills and attitudes, whereby the originally direct social relationships between teachers and students are substituted to a great extent by indirect relations which are characterized by technical rules and prescriptions, a context-free language, conditioned prognoses and conditioned instructions, goal attainment with the help of target-means relations, and the systematical increase of effectivity.*

With regard to the objections of cultural critics it must be stated here that the described change of behaviour is, indeed, a deep one, and therefore, full of consequences for the didactical structure of distance education. The fears of negative consequences, for instance, the mechanization, functionalizing and depersonalization of instruction are real. Obviously, these processes are inevitable in such a specialized system of teaching and learning. And important educational goals such as individualization and the extension of the domination-free communicative action cannot be reached.

A critic who compares distance education with face-to-face instruction will consider these deficits as really serious ones. The considerable structural difference between the two forms of instruction, however, suggests that such a comparison is not really helpful. Thus it must be regarded as inappropriate to want to use the new systems of rational thinking in instruction to achieve exactly what was possible with the system of communicative action. It would be more appropriate to ask whether the standards of communicative action must and may still be valid reference points for the evaluation of the social relationships between teacher and taught. We must also teat whether the gains in teaching capacity in the reproducible system of rational thinking are not so great that deficits in the case of certain learning objectives of the type referred to can be regarded as acceptable. In this context the basic question has to be put once again whether all mediation of knowledge and skills has to be a priori permanently connected with forms of communicative action, or whether the socialization and cultural effects—the acquisition of norms, values and symbols either consciously or unconsciously—cannot take place in other experiencing and practical contexts as well.

If, in addition, when answering this question we start from requirements made of people living in industrial societies today, there is another aspect which plays a part. People in industrial societies have had to find their way around the secondary system referred to, and make good use of the subsystems contained in this system. This ability can obviously only be imparted by a form of instruction which is not based on communicative action alone. Exaggerating only slightly, it can be said that a form of instruction based exclusively on communicative action, which by nurturing the 'innerliness' of teachers and students enables them to develop complete, individual personalities, cannot achieve a current generally applicable learning objective, because it well not teach students how to manage the 'apparatus of existence' of the 'secondary school system' in an advanced industrial society.

Reflections of this nature can lead to the conception of a dual educational system in which it will be possible for students to relate communicative and rational actions to one another in lessons. On the other hand, it is necessary to relate the differences between the two subsystems brought out so far to a more fundamental problem. With an analysis of its particular structural elements, distance education can be seen as a system for the extension of our disposal of technical means in education. Therefore, it must be related to another analytical level than face-to-face instruction which is based on the ways groups of persons see themselves and their traditions. Following Habermas, it could be stated that the increasing application of techniques of distance education results in a variation of the general problem of how usable knowledge can be employed in a social world. Obviously, there is a clash of two different intellectual traditions: the hermeneutical interpretation of the contexts of life, and empirically obtained and technically used knowledge. In a similar context Helmut Schelsky distinguished between science as reflection and science as technology. The juxtaposition of two respective different forms of teaching and learning has not yet been theoretically incorporated. It conveys a 'life problem of our civilization' namely, how the relations between technical progress and the social world, which are today still natural, can be reflected and controlled by a rational discourse. This will become a central problem of the new didactics.

Anthropological interpretation

If one relates distance education as a form of industrialized education to anthropological terms of reference, the question arises how to interpret the phenomenon that man uses technical media in order to be able to teach and learn at a distance. To answer this question requires consideration of two general features which were very important in human development: people's attitude towards technology and their ability to be challenged by new conditions of their environment and to renew themselves through it.

On the many anthropological models of interpretation that of Arnold | Gehlen seems to be most suitable for the purpose of this discussion. Following Herder and Schemer, he sees man as a being characterized by biological deficiencies, lacking specialize4d organs and instincts, and not adapted to a particular species-specific environment. This means that he must necessarily rely on his own cautions and must make his environment himself.

In order to achieve this, people need technology, which compensates for their deficiencies in the sense of the substitution, intensification and relief of their organs. Therefore, technology had a determining influence on man's interaction with nature throughout his development. In a general sense, technology belongs to him and technology mirrors his being. Technology is, as it were, the 'great being'.

The 'continuously increasing substitution of the organic by the inorganic can be considered a relevant result of our cultural development'. This is a process which began as early as the anthropogenesis and which has accelerated increasing during the last centuries and decades. 'The development of mankind is, hence, not a purely biological one, but essentially a development of substitute organs for missing ones,' concludes Rothcker, taking Gehlen's approach. And he refers to the first important substitute organs-namely tools, language, abstraction, reason and thinking. In a long course of development man had to get used to handling these and other substitute organs and to learn how to use them; that is, how to substitute by tradition what heredity had withheld from him.

In the context of this argument it is important to note that the substitute organs are media which are also used in instruction, and that tools, language and thinking are assigned to the same categorical level. In order to stress the importance of these media, one of the first substitute human organs - language – will be discussed in a preparatory digression as it shows paradigmatically to what degree even anthropogenesis depended on a medium which first had to be created. Furthermore, with the help of this medium, effects can be identified which are comparable to those which are achieved by the mechanization and industrialization of instruction. Finally, language is chose as an example as it is certainly above suspicion for even the most severe critics of culture, as it is not considered a part of technology, but rather a part of culture which is allegedly in opposition to technology.

Marshall however, typically enough, called language a human technology. By referring to a quotation from Bergson's *L'Evolution creative*, emphasized that it enabled the human intellect to separate real objects from its environment. Without language, he explain, human intelligence would have remained totally involved in the objects of its attention. A short reflection shows, indeed, that people can distance themselves from an object only if they have found a word for it - the pre-condition of any detached consideration. Kurt Strunz characterized this development in this way: 'Man is released from the prison of the here and now of his environment'. And he added that it was only through language that man was able to give an overview and ordered analysis of reality, including past events and distant phenomena. The fundamental importance of language is further clarified by McLuhan's comparison : 'Language does for intelligence what the wheel does for the feet and the body. It enables them to move from thing to thing with greater ease and speed and ever less involvement'.

The reference to a lesser degree of involvement can be judged positively and negatively. On looking more carefully one can see that already this early use of a medium necessarily connects the advantages mentioned with important disadvantages. As language extends and amplifies man's thinking, and as man learns to handle it as a technical extension of consciousness, it also diminishes his originally very important intuitive awareness of collective consciousness. Thus, 'speech acts to separate man from man, and mankind from the cosmic unconscious'. Strunz observes that the spoken word changes human inwardness as it objectified it. And here he sees dangerous implications. The verbal fixation of contents of the world and the inwardness blinds him with regard to the things we do not understand. His detachment alienates him from reality, its contents are 'talked to death'; and, finally, there is also the misuse of the word, in false gossip, in the distortion of the truth, and in lying. A further danger is that language tends to become independent, to develop in its own way, and thereby to assume an inadequate importance which is separated from reality. This may render communication more difficult, or block it or make it open to manipulation.

The example shows the enormous adaptations which became necessary when humans learned how to use the medium of language. Their structures of consciousness changed to a high degree. One might assume that people acquired language only reluctantly and that they refused to use it in some areas of their life altogether, as they were afraid that, for instance, religious and social relations would become stunted. Even today there are situations in which the exchange of feelings is so subtle that the persons involved believe that talking about them would destroy everything'. The use of the medium of language was, on the one hand, an important gain for the development of mankind and, on the other, a considerable loss. The same can be said about the use of newer media in instruction; namely, writing, and later print, and still later electronic media. And the same holds true for industrialized education. It must, however, be acknowledged that the losses were by far outweighed by the extraordinary and even epoch-making advantages. In all cases the use of media made it possible to solve educational tasks which so far had been insoluble.

For the interpretation of industrialized education it is important to see that there are similarities in the consequences of the use of the medium of language and of modern technical media. The following insights have been gained: (1) instruction has been removed from its close attachment to given places, times and persons; (2) teachers and students become detached from reality - that is, from the life of the learning group; (3) as the teaching behaviour is objectified the students have it practically at their disposal. They can actualize the teaching with greater case and speed whenever they wish to learn. Thus, instruction is released from the prison of the here and now and of a given environment. This opens it up for further developments in new dimensions.

Considering the structural similarities conveyed by this analogy, the question suggests itself whether industrialized instruction can release, intensify and differentiate intellectual faculties in the same way as language has done as it is also no longer tied to fixed places, times and persons.

If we follow Gehlen's approach, industrialized instruction can be understood as a complex technical system of teaching and learning which man is forced to develop as he is no longer able to cope with all the instructional and training tasks of the advanced industrial society by means of his natural organs. In the same way as technology was called 'the great teacher'. In order to be able to fulfill its tasks, the great teacher operates with the help of substitute organs which are to intensify and extend the following human organs or faculties:

- The voice of the teacher, which can scarcely fill a large auditorium, is intensified and extended by media such as audio tapes, records, television, and in a coded form as printed material. In this way it can reach practically every home of this globe - and with the help of radio waves, even out into space. Some of these media transmit the teacher's picture as well and even their gestures and body language, so that the teacher's total teaching behaviour can reach practically everyone;
- The forefinger, an organ which is so unspecified and so deficient that it had already been extended by the pointer in the pre-industrial era, is extended and intensified by graphical representations, careful camera work, and the application of multisensoric stimuli techniques. The camera, for instance, can be directed to the object to the shown in such a way that it appears more precisely than in reality. With the help of cinematographic techniques, for instance, focusing, close-up, microscopic filming, slow motion, quick motion and trick filming, it becomes possible to present the object to the student, didactically speaking, much more effectively than it is possible in reality;
- The eyes and ears of the teacher which inform her or him

about the learning behaviour of his students are substituted and intensified by the empirical collection of data and their evaluation with the help of the computer. In this way tens of thousand of students can be observed at once with regard to their particulars, their relevant previous qualifications, their entrance behaviour, their gains in knowledge and skills, the results of specific tests, and possibly also the change in their attitudes;

- The memory of the teacher, which is often not as firm and infallible as he or she might wish and which is in addition often also tied to certain situations, is extended by powerful external data banks and computer programme and thus becomes extraordinarily exact;
- The art of teaching - that is, the didactical decisions which are necessarily tied to given persons and situations in face-to-face instruction - is substituted by strategies and technologies which address all students wherever they might live.

In general, the following statement can be made: Human organs can be substituted, intensified and relieved in the ways described in an industrial society only, and the extent to which this happens will increase together with the further industrialization of society. The new possibilities for teaching and learning resulting from this development are not yet fully foreseeable.

Having interpreted the technically designed distance teaching system as equipping the teacher with artificial organs, thus enabling him or her to tackle instructional and training tasks of unprecedented magnitude, reasons why the decisive changes which industrialized instruction brings about have to be accepted now have to be given from an anthropological aspect.

Present-day man can be characterized by the fact that he is challenged in an unprecedented way by the extreme disproportion between the possibilities of his natural body and of his teaching and learning habits handed down by tradition - and the immense increase in instructional and training needs. With regard to these needs, which are very likely to increase in the future, the individual, indeed, proves to be a biological deficient being who, because of his morphological helplessness, is bound to fail in his efforts to cope with them. Since the natural teaching capacity is already at a premium in traditional forms of education and since it will be lacking even more drastically when it has to fulfil the needs of the disadvantaged in industrial as well as developing societies, the only way out is to teach and to learn in an industrialized way. This is a pre-condition for enabling as many people as possible to take part in the emerging industrial world civilization.

Heinrich Roth in his *Pedagogical Anthropology*, summed up his discussion about the biologically caused release of man from his environment by saying that man is 'world-open', in the sense that he is not tied to his environment, not adjusted to adaptation, but rather to change. This means that he actively organizes his environment. In fact, he is 'the only being who is able to react to change of his environment and who is best in experimenting with it'.

Industrialized education must be seen as the result of such a basic disposition as well as of an epoch-making thrust in the development of mankind. Now, people face the necessity of coping with 'a new and greatly advanced situation'. If they employ industrialized forms of education they will surely have to bear grievous losses of traditional forms of life. But this happened again and again in the history of mankind whenever new media were used. The design and the implementation of further forms of industrialized education will also be risky. However, the difficulties to be expected are part of those critical developments typical for our time of transition from the last phase of the last western visualization to the first phase of the emerging global industrial civilization. This development may raise mankind to a high general level of civilization never reached before.

Seen anthropologically, man is also 'a being open for the future'. As such he will be able to overcome the critical structural changes which result from such transformations of civilization and in education especially from the juxtaposition of traditional occidental forms of instruction and the industrialized forms of teaching and learning in the coming world civilization. History has shown that 'man has repeatedly been able to overcome extremely advanced alienations which were caused by transformations of humanity .

The arguments of the critics of culture that the humanity of education is threatened by the use of rational planning and organization, and of technical media, no longer hold true in the light of this anthropological discussion. Seen in a larger context the construction of complex technical systems of teaching and learning and their successful implementation must be interpreted as a real proof of man's capacity to react to fundamental changes of society. It is a building block for the 'secondary environment' which people must create in order to survive. In the same way in which technology was not anything strange or even hostile to the inner nature of man in the anthropogenesis, their efforts to industrialize instruction, their ability and skill to instruct extremely large groups of persons with the help of technology can be interpreted as a condition for the possibility of survival in the forthcoming industrial world civilization.

15

Defining Distance Education

It is easier to devise a definition than to accept someone else's. It is not the purpose of this study to devise yet another definition of distance education but to highlight those elements which are essential to any definition.

Of the many definitions of distance education which have been prepared in the last decade four have been chosen for analysis. An attempt has been made to make them as representative as possible.

Holmberg is from Sweden, works in the Federal Republic of Germany and often writes in English. The French definition is from official government sources which formulate policy on the administration of distance education. Moore has worked extensively in the United States of America and today is senior counsellor in the Southern Region of the Open University of the United Kingdom.

It will be seen at once that three of the definitions are descriptive. Peters, however, presents a new philosophical analysis of distance education as 'an industrialised form of teaching and learning'. If Peters" definition, or any elements of it, is accepted, a radical separation of distance education from other forms of education is effected.

Holmberg

Basic to Holmberg's definition are two elements both of which can be considered essential:

- the separation of teacher and learner
- the planning of an educational organisation.

The separation of teacher and learner is fundamental to all forms of distance education whether they be print-based, audio/radio-based, video/television-based, computer-based or satellite-based. This separation differentiates distance education from all forms of conventional, face-to-face, direct teaching and learning.

The structuring of learning materials and the linking of these learning materials to effective learning by students through an educational organisation differentiates distance education from private study, learning from interesting books or cultural television programmes.

The French law

On 12 July 1971 the French Government passed a law regulating the conduct of distance education in its territories. This law contained the definition of distance education translated at the beginning of this article.

Again two elements are basic to this definition:

- the separation of teacher and learner
- the possibility of occasional seminars or meetings between student and teacher.

The separation of teacher and taught is underlined as it is in Holmberg's definition and it can be accepted that no one in Holmberg's definition and it can be accepted that no one would wish to propose a definition of distance education which did not include the possibility of face-to-face contact 'on occasion or for selected tasks'. The wording of the law can be challenged in that it is so broad that it could encompass certain forms of conventional education.

Moore

Moore's definition highlights three elements:

- the separation of teaching behaviours and learning behaviours

- the use of technical media
- the possibility of two-way communication.

His analysis separates teaching into two areas: in normal face-to-face teaching the teacher's preparation is done apart from his students and he teaches in the presence of students. In distance education both the preparation and the teaching are done apart from students.

The emphasis on technical media and two-way communication are valuable additions to what has already been presented. It is important for Moore that the system should allow the learner to initiate this communication.

Moore's definition was further elaborated by Rune Flinck who presents it as follows:

Distance education is a learning system where the teaching behaviours are separate from the learning behaviours. The learner works - alone or in a group - guided by study material arranged by the instructor who together with the totors is in a location apart from the students, who however have the opportunity to communicate with a tutor/tutors with the aid of one or more media such as correspondence, telephone, television, radio. Distance education may be combined with various forms of face-to-face meetings.

This development of Moore's thought is more comprehensive and introduces the notion that the teaching role may be shared and that different study situations are possible for the learner.

Peters

The three definitions so far considered can probably be accommodated within any basic theory of education. The major theoretical formulation of distance education so far published, Otto Peters' Die didaktische Struktur des Fernunterrichts. Untersuchungen zu einer industrialisierten Form des Lehrens and Lernens takes quite a different position. It merits careful study.

Peters begins the theoretical part of his analysis with a description which coincides quite readily with the three considered so far:

Distance education is a form of indirect instruction. It is imparted by technical media such as correspondence, printed materials, teaching and learning aids, audiovisual aids, radio, television and computers.

Basic to this description are two of the elements already identified; separation between the teacher and the learner, and the use of technical media. Peters' analysis, however, proceeds much further than the others considered and leads him to the conclusion that the didactical structure of distance education can best be understood from industrial principles especially those of productivity, division of labour and mass production. The mechanisation and automation of teaching methodology and the dependence of teaching effectiveness on prior planning and organisation lead him to posit a radically different role for the teacher is distance education from that exercised in the lecture hall or seminar room.

This leads Peters to the definition quoted at the beginning of this article. The definition can be queried in the emphasis that it places on the course production process. Many would consider this as only the start of the learning process and expect some reference to tuition and teacher/learner exchanges.

Peters next considers other theories of distance education and gives a comprehensive listing of those that have been proposed:

- a fringe form of ordinary teaching;
- an institutionalised form of individual study;
- education through teaching aids;
- expanded form of teaching by correspondence with

feedback;

- special type of mass education.

He is led to the conclusion that all are inadequate as explanations of the phenomenon described.

Peters concludes with an attempt to define the relationship between teacher and taught in a distance education system. He characterises this relationship as being controlled by technological rules, maintained by emotion- free language (and not interactional speech), based on a limited possibility of analysing students' needs and giving them directions (not on expectations built on personal contract) and achieving its goal by efficiency (and not through personal interaction).

In earlier writings Peters had laid the ground for his theory of distance education:

> Correspondence instruction is the most industrialised form of instruction, and the usual theoretical criteria for the description of traditional instruction do not help very much in analysing correspondence instruction. This has suggested the introduction of *new categories* taken from those sciences investigating the industrial production process. It is, in fact, astounding to see how much better these criteria help to understand and describe the institutional process in correspondence instruction. Some of the suggested criteria are: division of labour (on the side of teachers); mechanisation; automation; application of organisational principles; scientific control; objectivity of teaching behaviour; mass production; concentration and centralisation.

This brief presentation cannot do justice to Peters' attempts to show that distance education is based on a new academic theory which is quite alien to traditional didactics. He is quite convinced that distance education has its own laws of didactical structure, great teaching potential, serious didactical flaws and that it presents opportunities and dangers to both teachers and students which are not yet fully studied.

Anyone professionally involved in education, he maintains, must presume the existence of two forms of education which are strictly separable: traditional education based on personal communication and distance education based on industrialised and technological communication.

There have always been those who have objected to such a presentation and two of the objections will be considered briefly here.

> Much confusion stems from the popular misconception that correspondence instruction is somehow different in kind from resident or institutional instruction. This simply is not so. Correspondence instruction shares the same goals and the same educational philosophy as many different methods of instruction. It differs from them primarily in the means, in the method itself.

Similar views are often encountered in Australia where an 'integrated mode' of distance education is practised in many universities and colleges. In the 'integrated mode' a lecturer is given responsibility both for a group of conventional, on-campus students and for a group of distance education students, known as external students. Learning materials are usually developed in close parallel with the lecturer's lecutre-room course and the same assignments and examinations are provided for both on-campus and external students.

It is in this context that some Australian educationalists can write of 'the blurred demarcation between on-campus and off-campus studies':

> External studies, off-campus studies, or distance education, as it is variously called, is no more than a method of teaching. I believe that we shall move much more to the provision of carefully prepared learning materials and study guides for our students and to much more flexible attendance patterns. If this occurs it will become virtually impossible to designate students as on-campus or off-campus students, or to

designate institutions which are teaching in the off-campus mode.

This is not the place to debate whether distance education should be integrated within or separated from conventional face-to-face programmes. The contention is, however, that what is said here of distance education should be applicable mutates mutandis to the distance education segment of an integrated programme.

The second objection to the claim of a radical separation in didactic structure between distance education and conventional education is based on the idea that Oto Peters, and many educational philosophers with him, have misinterpreted what occurs in conventional education, especially at university level.

At the culminating states of education there is little distinction between teacher and taught; they are both participating in the shared experience of exploring a participating in the shared experience of exploring a common world. The teacher is simply more familiar with its contours and more skilled in handling the tools for laying bare its mysteries and appraising its nuances. Occasionally in a tutorial this exploration takes the form of a dialogue. But more usually it is a group experience. The great teachers are those who can conduct such a shared enterprise in which all are united by a common zeal.

There is clearly a huge gulf between this statement and the industrialised process that Otto Peters describes. The counter argument runs that it is incorrect to say that in traditional education learning takes place in the lecture room and that the teacher's role is therefore of crucial importance. Good adult education, the objection claims, is essentially self-education by the learner based on private study in libraries, audio-visual carrels and laboratories. Those who support the view that distance education is radically to be differentiated from conventional education would point out that access to the university's library and carrels is not often possible for students who study at a distance from the institution and that the use of indirect teaching methods in face-to-face instruction does not make it identical with distance education.

In spite of these objections one can grant to Otto Peters that he has highlighted a characteristic of distance education that should form part of any definition:

— it is the most industrialised form of education.

Nature of distance education

It must also be conceded that Peters has attempted to get to the nature of distance education and that the two objections just quoted, and many others like them, seem to neglect certain fundamental aspects of distance education. There are five reasons for this:

1. In traditional education a teacher teaches. In distance education an institution teaches. This is a radical difference. In traditional education the teacher is present in the lecture room with students and his success often depends on the rapport he can build up with students: personality and even idiosycracies may be central. In distance education the teacher prepares learning materials from which he himself may never teach. Another teacher may use the materials and evaluate students' work. The pedagogical structuring of the learning materials, instructional design and execution may be assigned to others. Personality needs to be played down, idiosyncracies eliminated. The teaching becomes institutionalised. Different skills are needed as even part of the content of what is taught may be contributed by others.
2. In distance education the goal of linking of learning materials to learning is at the centre of the organisational structure. In conventional education the 'intersubjectivity that R.S. Peters saw as central to the teaching/learning process is automatically set up. In distance education this 'intersubjectivity' is lacking and

there can be no guarantee that anything will happen once learning materials have been developed and dispatched to the student.

Administrators of distance education systems who consider that distance education is merely a 'fringe form of traditional education' often forget to provide this linking. They feel that once the learning materials have been developed and dispatched to the student the job is done: learning will occur. In distance education there is no basis for this unless a successful linking system is provided. Even then questions on the quantity of learning, the quality of the learning and the status of the learning remain for solution.

3 From the student's point of view there are important differences between the two systems of education. The distance system gives a radical new meaning to the concept of the independence of the audult learner. In this system he is responsible for initiating the learning process and, to a large extent, for maintaining it throughout. Questions of motivation and skill acquisition, of a specifically different kind to those required in traditional education, need to be tackled to combat the phenomena of non-starters and drop-outs that have been a feature of this type of education throughout the last one hundred years.

4 Management skills that are more akin to those found in industrialised enterprises are needed in distance education. The distance system has daily preoccupations with lead times, deadlines, print runs, job schedules, typefaces, warehousing, delivery and dispatch and planning decisions on educational priorities that must take place two, three or more years before teaching is to take place. Such pre-occupations are not normally characteristic of educational administrators.

5 Distance education is a form of education that can easily become depersonalised both for staff and students. Students are not invited to Milton Keynes nor to many of

the distance education institutions throughout the world. There is little doubt that the absence of students can create a strained atmosphere for lecturers. The constant process of writing creatively for distance students, whether alone or in a course team framework, poses problems, which are not fully resolved even in those institutions were the lecturer has some responsibilities for on-campus students as well. The marking of distance students' work, even when relieved by face-to-face seminars, telephone tuition and work for radio or television has a definite propensity for staff disillusionment.

Much has been written, from Marx to today, on alienation in the workforce. In an industrialised form of education where division of labour is necessary, where organisational planning and scheduling of a precise kind are essential and where educational decisions may be controlled by mechanised and automated processes the possibility of alienation among the workforce is real. It is even more real when the workforce is composed of academics whose qualifications and training have not prepared them for work in the most industrialised form of education.

Summary

From the examination of the four representative definitions of distance education in this section the following characteristics have been highlighted. All six are to be regarded as essential for any comprehensive definition:

- separation of teacher and student
- influence of an educational organisation especially in the planning and preparation of learning materials
- use of technical media
- provision of two-way communication
- possibility of occasional seminars
- participation in the most industrialised form of education.

The next stage is to show what forms distance education may take and why certain kinds of non-traditional education do not fall within its scope.

Forms of distance education

Distance education has been in existence for about one hundred years. The elements of a definition that have been established in the previous section do not therefore exist as abstractions; they must correspond to the reality. This section focuses on forms of education that are included within the concept of distance education; what is excluded is treated in the next.

Three different approaches to identifying the forms of distance education are presented: the medium on which the learning materials are based, institutional type and didactic model.

Choice of medium

The different forms of distance education can be identified by their

- use of technical media
- as the basis for the learning materials.

A possible presentation of the bases of the learning materials is given schematically on the previous page.

Print-based. By far the great majority of distance education programmes are print-based. The teaching basis of the Open University of the United Kingdom, for example, is approximately 80% print-based, 10% broadcasting (radio and television) and 10% face-to-face seminars and summer schools.

A real disservice has been done to the field of distance education by overemphasis on terms like 'University of the Air'. Educators, administrators and politicians, not only in developing countries but also in developed countries where finance for education is now being limited, should realise that the vast majority of distance education courses are print-based and will remain so.

Exceptions to this in the foreseeable future will come only with populations for whom literacy is a problem and perhaps in those regions where there is traditional reticience about correspondence-type programmes. Higher education in the United States of America is an area where an attempt to transfer emphasis to videotape-based or computer-based programmes might be worth considering because of the population's interest in technology and dislike of correspondence study.

An interesting variant on print-based programmes are the courses by newspaper developed under the leadership of Martin N. Chamberlain, Dean of University Extension at the University of California, San Diego. The Deutsches Institutfur Fernstudien at Tubingen has recently introduced a similar programme in the Federal Republic of Germany.

Audio-based courses in which the educational content is carried by audio-cassettes or transmitted over radio and to which printed materials are peripheral, if used at all, have been used by distance educators. They are frequently cost-effective, can be used by people with literacy problems and may be a successful method of teaching languages. The University of Waterloo in Ontario is an extensive user of this method.

Video-based. Distance education can be video-based when the basic educational content of the course is broadcast on television or contained on video-cassettes. Some printed materials containing background, further reading and assessment procedures often are supplementary, to the course. The development of cable television and the possibility of home ownership or rental of VCRs make this an area of interest in some cultures.

Series of programmes for television have already been developed by a number of groupings in America and elsewhere and a series of programmes based on video-cassettes is offered for credit by the independent study division of the University of Minnesota. Such programmes are to be regarded as distance education when they satisfy the characteristics outlined in the first section of this article.

A variant of both audio and video-based programmes is the educational use of satellites. Daniel presented an evaluation of the first attempts at satellite-based programmes to the 11th World Conference of the I.C.C.E. at new Delhi. Interest has also been aroused by the educational programmes of the Appalachian Area Satellite Project.

Computer-based. A computer can be the medium on which educational programmes that fall within the definition of distance education are based. A number of institutions have developed computer-based distance education programmes and the Fall Education Company lists over 300 computer-based courses already developed for the ATO system. They range from Accounting Fundamentals to Zeiss-a model Planetarium. It is known that in America negotiations are in progress for the accreditation of some of these computer-based programmes for college and university credit.

No evaluation of the relative merits of the media described nor of the possibility of developing a multi-media system by combinations of the various components is offered here. Nor can consideration be given to whether it is possible or desirable to combine distance education with on-campus education. That is the work of other studies.

Institutional type

When consideration is given to the

- influence of an educational organisation especially in the planning and preparation of learning materials
- two major groupings of institutions can be distinguished: those that are privately sponsored and those that are publicity supported.

Private, proprietary correspondence schools have made valuable contributions to this field of education since the last century. In recent years standards have been set by affiliation to national accrediting bodies: the National Home Study Council of the U.S.A., the Association of Accredited Correspondence Colleges of the United Kingdom. Some of these institutions are non-profit making and a number receive some government support and they are found throughout the world.

Government sponsored schools, colleges and universities have played a role in distance education for the last seventy years. Many of these institutions are specially structured for distance education: Athabasca University, Edmonton; the Open College of Further Education, Adelaide; the Centre National de Tele-enseignement in France; the Fernuniversitat-Gesamthochschule in Hagen. Many other colleges and universities have a department which concentrates on the distance students : the independent study department of the University of Minnesota, Minneapolis; the external studies department of the University of Queensland, Brisbane.

The Open University at Milton Keynes in the United Kingdom founded only ten years ago, has already made an impressive contribution to research, theory and practice in the field of distance education.

This wide range of institutional type, incorporating both public and private operations, makes the defining of the limits of the educational field within which all lie a difficult task. It is felt, nevertheless, that all institutions in this area because of the separation of their students from their teachers are engaged in the planning or purchase of learning materials and possess or have access to an integrated range of technical media, by which the student is given the possibility of two-way communication, not only when beginning but throughout the course. These institutions are representatives of the most industrialised form of education.

Didactic model

Three forms of didactic structure characterise distance education institutions, especially when considered under the headings:

- provision for two-way communication and
- possibility of occasional seminars.

Variations of the three models presented here are to be found employed by the different institutional types considered above in their effort to link learning materials to learning.

The correspondence schools send learning materials by post to the student, the student studies the materials and posts assignment back to the institution which marks and comments upon them and posts them back to the student.

The correspondence element in distance education is here reduced to a minimum and once the learning materials have been developed and distributed to the students, the emphasis is placed on compulsory fortnightly two-to-three hour consultations. At these, groups of students meet their tutor for evaluation of their home study and for explanation and preparation of the next stage of learning materials. In the third and fourth year of study the frequency of the consultations is greatly diminished.

In a system similar to that of the Open University of the United Kingdom the link between learning materials and learning is promoted by as coherent a structure as possible. The student is supported by a wide range of activities, most of them optional unless the course team has decided otherwise. This tends to strengthen the possibility that learning takes place and that unnecessary drop-outs are prevented.

From time to time distance education is described as 'the opposite of face-to-face education".

This statement needs to be taken further as there are many forms of what may be considered the 'opposite of face-to-face' education that are not distance education, as the following diagram shows:

Relationship of distance education to other forms of indirect education

Indirect education

This distinction is again based on an idea of Peters and merits attention because of the importance in definition of what is excluded. Each of the following forms of indirect education lacks one or more of the characteristics of distance education.

Education by letter. From Plato and Paul to Erasmus letters have been used for instructional purposes and the practice, doubtless, continues today. They lack the structuring of an educational institution that is a characteristic of distance education.

Printed education. Pamphlets, books and teach-yourself manuals fall into this category. The lack of an educational organisation is again the major factor which distinguishes these from distance education, together with the impossibility of two-way communication. It is clear that many people learn a great deal from these means, even though they may lack didactical structuring or even an educational goal.*Teaching kits*. In increasing use in face-to-face teachering are kits of various kinds containing samples, games and specimens on which students are invited to work without supervision.

Audio-visual aids. When a lecturer communicates with a student by means of audio-visual aids: slides, film, audio and video-tapes, he is teaching indirectly.

Depending on the structure of the programme within which they are being used, these forms of indirect teaching can form part either of face-to-face instruction or of a distance education programme.

Radio and Television. Many people learn a great deal from radio and television and sometimes those media are used in distance education programmes, Kenneth Clarke's

Civilisation or Jacob Bronowski's The Ascent of Man were not conceived as part of a distance education programme. Nevertheless they have become part of both on-campus and distance education programmes when offered for credit with accompanying didactically structured assignment, reading and assessment materials.

Programmed learning, which was popular in the 1960s, is a form of indirect teaching which has many similarities to distance education. Both demand extensive preparation of learning materials, careful sequencing and tend towards the individualising of learning.

Computer-aided learning is a recent form of indirect education and is used extensively in many conventional teaching programmes.

Mention is made here of independent study and private study as two forms of education with similarities to the above.

Independent study. There are many forms of independent study amongst which can be classed study guided by a governess, tutor or counsellor and many contract, independent or external degree programmes in American colleges.

Private study can be seen as neither a form of direct, classroom education nor of indirect off-campus studies. It is widespread and devoid of institutional linkages, though it may be based on materials developed for use within an institution either for traditional classroom students or distance learners.

Programmes with some similarities to distance education

There are certain forms of education which have some similarities to distance education but are not identical with it. Four of the most important are here presented for consideration: extension programmes, University Without Walls, experiential learning, the external degree. Three more general terms: 'non-traditional learning', 'off-campus studies' and 'open learning' are first considered briefly.

One cannot define 'non-traditional learning' without first defining 'traditional learning' and that is clearly beyond the bounds of this article. It seems at times that in the United States any educational programme that is not a four-year, residential, university degree programme can be regarded as non-traditional learning, though there are clearly more restricted usages. "Non-traditional learning' is to be regarded as a vague, generalised term of which distance education is one example. 'Off-campus studies' is another general term for any programme which does not take place on the central university or college campus - distance education is one possibility.

Wedemeyer gives an accurate analysis of 'open learning':

> It is difficult to find a common definition for the many experimental programmes that call themselves *open*. However, all open schools have one principle in common: they are to a greater or lesser extent efforts to expand the freedoms of learners. Some are open only in a spatial sense while others provide freedoms in more significant dimensions - in admissions, selection of courses, individual adaptation of the curriculum and time, goal selection and evaluation.

'Open learning' therefore, is a term that is not to be used in an administrative context; rather its context is philosophical to describe, for instance, colleges with 'open' administration policies or a special spirit like Paris VIII at Vincennes, *l'Universite Ouverte*. Some of these are face-to-face institutions, others teach at a distance.

Extension programmes are ways of extending the expertise of a university or college to new populations. The terms can imply offering the same programmes as for full-time, day-time students by different means, at different locations or at different times. An extra-mural department usually has a similar function of extending the expertise of the university to a broader community. Some of these programmes are for credit, others not.

The range or extension and extra-mural programmes is very extensive and distance education can be regarded as one grouping of a number of possibilities of providing education outside the normal lecture room. Extension, especially as used in the United States, is a much broader term which can include part-time day or night, conventional lectures on campus.

University without walls implies the design of an individualised programme based on a learning contract for students with clear learning objectives who cannot realise their whole educational aspirations through existing programmes. A University Without Walls programme can include experiential learning credits, ordinary lectures, distance education elements, learning from community sources or job-related activities, all of which can be evaluated towards a college or university degree.

Experiential learning programmes are those which give credit for prior learning which did not take place in a lecture room setting and was not sponsored by an educational institution, but was acquired through work experience including volunteer work, co-operative education or self-study.

A degree programme which can be completed in the following manner: a student entering the programme with the minimum entrance qualifications can complete it with less than 25 percent of the required work taking the form of campus-based classroom instruction.

In the attempt to place some conceptual order around the wide range of study programmes that are associated with non-traditional and distance education, the question of whether or not the external degree should be included within the concept of distance education is the one which poses the most precise definition and research problems.

In so far as the external degree serves to describe the programmes whose primary function is to recognise education and attribute to it an appropriate qualification, it does not fall within the concept of distance education as it has been presented in this study. If, on the other hand, it is used to describe programmes whose function is to provide education for students, then it may be identified with distance education providing it agrees with the descriptors given in the first section of this article.

One hundred and eight-three college and university degree programmes are classified as external in the American study referred to above. The Ed.D. programme from Nova University, Fort Lauderdale, Florida which has been at the centre of the controversy about the external degree in the United States in recent years is not mentioned.

The Nova doctoral programme consists of class meetings known as clusters which meet for eight hours once per month; reading requirements; written assignments and a major applied research paper.

Do the Nova Ed.D. and similar external degrees lie within the field of distance education as described? When attempting to formulate an answer one is faced with the fact that any doctoral programme contains large elements of private research and little face-to-face tuition.

Clearly the dividing line between the Nova cluster system and the consultation system of the German Democratic Republic is a thin one. This study tends to exclude the former because of its lack of emphasis on the pedagogical structuring of learning materials by the educational institution and because it is a less industrialised and technological form of education and tends to include the latter.

Terminology

The term 'distance education' has been used in this article.

It is meant to designate the cluster of educational organisations which are usually referred to as *Fernstudium* in Spanish and *teleducacao* in Portuguese but for which a number of different terms are used in the English-speaking world.

Other language

In german there is an awkward status question of whether *Fernstudium* 'distance study' refers only to higher education at a distance (universities and university-oriented colleges) and *Fermanterricht* 'distance teaching' refers to further education at a distance (technical and vocationally-oriented institutions). There seems to be some indication that *Fernstudium* will become the established term for all levels in the Federal Republic of Germany, as it is in the Germany Democratic Republic.

Tele-enseignement 'distance teaching' is an influential term in French because of its use in the titles of the Centre National de Tele-enseignement, (C.N.T.E.), the Centres do Tele-enseignement Universitaire (C.T.U.) and the Tele-universite de Quebec. There are some who would argue that *formation a distance* 'education at a distance' reflects more closely modern pedagogical theories.

The problem with *tele-enseignement* is that many do not realise that the root of *'tele'* is the Greek word *tele* 'from afar', 'from a distance' and does not refer to television. *Tele-enseignement* appears to be the generally accepted term.

The words *education a distancia* in Spanish and *teleducacao* in Portuguese seem to be gaining acceptance as terms for 'distance education', side by side with the spread of influence of this type of education in Spanish and Portuguese speaking countries.

English terminology

In English there are at least six major terms: correspondence study/education, home study, independent study, external studies, distance teaching, distance education.

Two propositions underlie what follows:

neolgisms are unnecessary in an area where there is already a multiplicity of terms 'distance education', although not perfect, is the most suitable term and should be used.

Correspondence study is not a suitable word for what has been described as 'distance education' in this article. It cannot describe radio-based programmes like *Ensemble*, television-based programmes like *The Great Plaine*, computer-based programmes in the PLATO series nor the Appalachian Satellite programme.

Communications theory experts tell us that words get tired and if they do then 'correspondence study' is a tired word. It is significant that when the directors of the correspondence schools of the United States of America came together in 1926 to form an association the title chosen was the National Home Study Council and not the National Correspondence Study Council. Charles A. Wedemeyer was chairman of a committee of the International Council for Correspondence Education (I.C.C.E.) to consider a change of name as many felt its present title was inappropriate if the organisation wished to remain a major influence in the field.

'Correspondence study' is a correct designation of that subgroup of the print-based areas of distance education in which student contact is not encouraged. It should continue to be used for such programmes and only for such programmes.

'Correspondence study/education' institutions have frequently a philosophy which suggests that students enroll with them because they 'want to be left alone', that student support services can infringe learner autonomy or the independence of the adult learner. They claim that student seminars do not add to student learning from a correspondence study system.

Home study is used mainly in the United States of America and is there confined to further and technical education. The 1979 listing of approved members of the National Home Study Council contain 94 institutions, most of them proprietary.

When the universities of the United States of American which teach at a distance wanted to form an association it is significant that they rejected the title 'Home Study' and chose instead 'Independent Study'.

'Home study' is thus unsuitable an a generic term for the wide range of teaching-learning activities which have been described.

Independent study is the term used in higher education in the U.S.A. The 1979 Guide to independent study through correspondence instruction lists 68 members of the Independent Study Division of the National University Extension Association. Nearly all of these are correspondence sections of extension departments of American universities. In addition to programmes for degree credit, may of the courses are at high school or certificate level.

Charles A. Wedemeyer has been the proponent of the term 'independent study' both in his writings and during a lecture tour of Australia which he undertook in 1977:

Independent study in the American context is a generic for a range of teaching-learning activities that sometimes go by separate names (correspondence study, open education, radio-television teaching, individualised learning). In several European countries such systems are culstered under the terms *distance education* or are still perceived as separate programmes without any basic, generic relationship.

He feels that the term 'independent study' has the capacity to encompass a wide range of activities and defines it as:

Independent study consists of various forms of teaching-learning arrangements in which teachers and learners carry out their essential tasks and responsibilities apart from one another, communicating in a variety of ways, for the purpose of freeing internal learners from inappropriate class placings or patterns or providing external learners opportunity to continue learning in their own environments, and developing in all learners the capacity to carry on self-directed learning, the ultimate maturity required of the educated person.

There are elements of a philosophy of educational maturity in this statement to which most distance educators would subscribe. The term 'independent study', nevertheless, is to be rejected as a generic term.

There are three reasons for this:

- the normal understanding of 'independent study' implies a different relationship to an educational institution (see section two)
- the ideal in distance education is not necessarily independence but, as John S. Daniel wrote, 'interaction and independence: getting the mixture right'
- in the United States of America an 'independent student' is one who sets up an individual study programme on a contract basis during an interview with a faculty member. The contract may include periods of normal lectures, unguided study or distance programmes.

External studies is the term most widely used in Australia, Its use is confined to that region where it well describes the essence of the 'integrated model' of distance education as found in many Australian institutions: 'external to' but not 'separated from' the faculty staff. It can have little claim to general acceptance because of this limitation and because of confusion with the American external degree. Whether or not the American external degree, especially those associated with Antioch and Nova universities, falls within the concept of distance education has already been discussed.

Distance teaching or teaching at a distance has been the term most commonly used by the Open University in the United Kingdom. Distance teaching is only half the process we are trying to describe: to distance teaching must be added distance learning.

16

Distance Education Theory

Distance education has managed very well without nay theory. It has been used to bring education, through print, radio or television, to thousands and thousands who would never get to school or college. And, as practitioners, at the British National Extension College and at the International Extension College, we have shunned theory, arguing that we were interested only in practice. Partly that is policy – though one man's policy is another's prejudice - and a desire to keep out in the wide open spaces of educational innovation rather than creep into the house of theory, seen as an annex to the ivory tower of academe. Partly it is a reflection of our intellectual tradition: The British were never ones for theory in any case. We have always been empiricist, anti-metaphysical in philosophy, mistrustful of theoretical systems. And partly it is a suspicion of two kinds of theory – of those which try to simplify education to a theory as grand as E = MC and those who try to restrict it to a theory which 'is neutral with regard to ends but exhaustive with regard to means'.

But questions about the theory of distance teaching will not go away. If we define distance teaching as 'an educational process in which a significant proportion of the teaching is conducted b someone removed in space and/or time from the learner', legitimate, general and therefore in one sense theoretical questions arise about the circumstances in which it is relevant. These questions are important if distance teaching is to be taken seriously as a set of educational techniques. They can be answered by references to theories of education and of communication.

If follows, then, that if we are to build a house of theory for distance education, its architecture will depend on existing philosophies of education, and theories of communication or diffusion; it will not be constructed from brand-new components. Within such limits it is possible to state a theory. For the sake of formality and to stimulate disproof, it is stated in the form of fourteen statements or hypotheses.

The statements depend upon political as well as philosophical views about education. In Distance Teaching for the Third World" we quoted Nyerere:

> Man can only liberate himself or develop himself. He cannot be liberated or developed by another. For man makes himself. It is his ability to act deliberately for a self-determined purpose which distinguishes him from the other animals. The expansion of his own consciousness, and therefore of his power over himself, his environment, and his society, must therefore ultimately be what we mean by development.
>
> So development is for Man, by Man, and of Man. The same is true of education. Its purpose is the liberation of man from the restraints and limitation of ignorance and dependency. Education has to increase men's physical and mental freedom - to increase their control over themselves, their own lives, and the environment in which they live.
>
> The ideas imparted by education, or released in the mind through education, should therefore be liberating ideas; the skills acquired by education should be liberating skills. Nothing else can properly be called education.

We went onto argue:

In other words, education is to do with power. People without education are at the mercy of those with it, who can use what they know to their advantage and to the disadvantage of the ignorant around them. Education is a means of gaining power, and not simply the right of the better-educated minority. On this showing the case for expanding education is a simple egalitarian one.

My starting point is, therefore, expansion - the need to expand education.

But the way in which education is expanded is also important. Expansion of schooling is of limited value if it simply reinforces the ideas that learning is a valuable possession, held by the teacher or shut within the covers of a textbook, that can be acquired provided the student listens or reads diligently and respectfully. Instead, with many educators, we would stress the importance of dialogue. There are, however, both weak and strong forms of the argument for making it central to a theory of education. The weak form of the argument points out that expression helps learning and that dialogue, giving an impression of human warmth and interest, encourages it. Learning is more effective if, through dialogue between student and teacher, the student can be shown how the new matter he is learning relates to what he already knows, and relates to his environment. And dialogue has an important checking function: it enables the tutor to check the student's progress, the tutor to check her method of presentation by seeing whether the student understand her, and the student to check the tutor, in case the tutor has actually got things wrong. The strong form of the argument goes much further and claims that, unless there is dialogue, education changes to indoctrination: dialogue is here seen as a necessary condition of an education which respects the humanity of student and teacher. This view is reinforced in much out-of-school education, where it is clear that the student's knowledge of the world in which he had grown up merits respect and attention along with the tutor's knowledge of her own specialism.

If those, then, are our aims - of expanding education and of stressing the importance of dialogue - then a theory of distance teaching should illuminate the ways in which it does, or does not, lead towards them.

The ways in which distance teaching is used are, of course, politically and culturally determined. If, for example, society rewards credentials and the diploma disease is rife, then it is extremely difficult for a distance-teaching institution to set off in a different direction. In Medico, for example, *Telesecundaria,* which uses television and print to support secondary education, is successful in getting children through their examinations - but by doing so may be merely contributing to urban drift and problems of unemployment in the towns. Distance-teaching institutions inevitably reflect the values of their societies. The experience of *Telescundaria,* or of the Free University of pre-revolutionary Iran, which was seen as a device to prevent students coming together, can be contrasted with the radio campaigns of the United Republic of Tanzania, which reflect something of the political philosophy of TANU in their attempt at mass involvement. The success or failure of a distance-teaching project will, therefore, depend at least as much on its political context as on its methods. Our arguments about method inevitably rest on political assumptions.

Expanding education

Experience enables us to make five hypotheses, our first five 'statements', about the way n which distance teaching can be used to maximize education. Chu and Schramm exhaustively analysed the literature on the comparative methods of different media, seeking differences between print, radio, film, television, classroom teacher and so on. Most of the research suggests that there are no significant differences between them in their educational effectiveness. Trenaman similarly found in comparing radio, print and television that 'the three media communicate a wide variety of material with roughly equivalent efficiently.' While differences between students or audiences, and differences between subjects, have a major effect on how easily something is learned, differences between the media seem to be far less important? Making the point very broadly, then, Statement 1 is: *you can use any medium to teach anything*. Much flows from this hypothesis; it has consequences for our methodology, considered below, and for our desires to expand education. For, if we can use a variety of media secure in the knowledge that they are comparable in their effectiveness, then we can examine how to use audio-visual media like radio and television, which enable us to reach audiences who could not get to school or college. And we can go on from considering the qualities of individual media to decisions about using a variety of media, and decisions about combining print or broadcasts with some face-to-face study.

It follows from Statement 1 that the face-to-face teacher is not unique in his/her ability to teach. And so we can depose teacher: *distance teaching can break the integuments of fixed staffing ratios which limited the expansion of education when teacher and student had to be in the same place at the same time.*

Traditionally the expansion of education has demanded an expansion in the number of teachers; if that constraint is removed by distance teaching then the prospects for expanding education may be enhanced, provided that distance teaching is no more expensive than teaching through orthodox methods. The prospect would, on the other hand, be no brighter if distance teaching were necessarily more expansive than orthodox education. Economic forces would then press any reasonable person into expanding ordinary schools and colleges. But distance teaching can be cheaper. With broadcasts, as with print, one teacher's words can reach a much larger audience than world ever be possible face-to-face so that economies of scale are possible. There is empirical evidence of such economies being attained. Jamison and Orivel, for example, considered twelve distance-teaching projects for which cost data are available and found that 'most of the projects studied here are less expensive than equivalent traditional methods of education' We can then make Statement 3: *there are circumstances under which distance teaching can be cheaper than orthodox education, whether measured in terms of audience reached or of learning.*

It is not always cheaper. At primary level, most teachers are paid so little that it is difficult to find any cheaper way of educating small children. At the other extreme, tertiary education is often so expensive that it is much easier to come up with a cheaper, distance, alternative. At any level it is fairly easy for distance teaching to work out as an expensive alternative if only a handful of students follow any one course or (if we are concerned with the number of students who successfully complete a course and not just with the number of enrollments) if the drop-out rate is high. And at any level costs per student are sensitive to the choice of medium. This can vary widely, so that one could conceive of the costs, for the same programme, of print, radio and television being in the ratio of 1:10:100. Statement 4: *the economies achievable by distance education are a function of the level of education, size of audience, choice of media and sophistication of production.*

If these hypotheses are true then we have established that distance teaching can be effective and that its costs can compare favourably with those of orthodox education. Universal post, and radio with its seven-league boots, thus make it possible to increase access to education, while the social constraints on the use of telecommunications are at least slightly different from those on the use of schools. The relevance of distance teaching to the expansion of education is clear, and our key Statement 5 is: *distance teaching can reach audiences who would not be reached by orthodox means.*

Dialogue

So distance teaching may help us towards our first objective. What of the second, to encourage dialogue? We are faced with a dilemma here. If teaching through broadcasts and print is linked with face-to-face study then dialogue is, of course, possible within that face-to-face element. It is far easier to envisage dialogue, if we use the term to mean our strong form or in the sense that Freire uses it, in face-to-face discussion, than through print or broadcasts. As educators, discussion, than through print or broadcasts. An educators, therefore, we are constantly under pressure to increase the face-to-face component of distance teaching. But, as well saw, the economic attractiveness of distance teaching springs from the economies of scale which it makes possible; we are equally under pressure to limit the size of the face-to-face component. A central problem therefore, concerns the balance between economic arguments, of crucial importance to us if we wish to widen access to education, and educational arguments, of equal importance if we want to emphasize dialogue. The way that dilemma is resolved, between quantity and quality, will vary from time to time and place to place; we return to it below when considering the methods of distance teaching.

In struggling with the dilemma, it is worth remembering that much orthodox education is not based on dialogue. Children are taught to learn things by heart; much agricultural extension assumes that the farmer should simply do what the extension agent tells him. In practice we cannot learn everything, in school or out, by discovery and dialogue. The tough challenge for distance teaching, then, is provide not merely as good opportunities for dialogue as orthodox education, but more such opportunities. Distance teaching has long been criticized for encouraging rote learning. Of its nature, correspondence education demands a respect for the printed word which is at odds with the sort of scepticism implicit in our view of education. Even a distance-teaching institution as sophisticated and generously endowed with arrangements for dialogue as the British Open University has not always overcome the problem:

> In far too many of the Arts assignments questions are set which it is virtually impossible for students to answer except by regurgitating the unit material ... Recently a nature student, just completing her Honours degree, wrote to me criticising a third level history course. 'When I learnt history at school', she said, 'and even when I've done the history blocks ... I've been given facts, and a sequence of events to learn. Now I'm given a series of hypotheses about which no-one seems to agree.

But many correspondence-based courses, at the Open University and elsewhere, do encourage dialogue of one kind or another. The radio campaigns of the United Republic of

Tanzania and Botswana set up dialogue between village learning-group members and both educators and government; Radio Educative Senegal has used feedback from radio groups to change government policy. Students in National Extension College correspondence courses confirm that dialogue, on paper and face-to-face, forms a central part of their experience, even though they learn mainly at a distance. Despite the inherent problems, therefore, of arranging dialogue when learning is based on materials produced in advance and distributed on masse, there is empirical evidence for tour key Statement: *It is possible to organise distance teaching in such a way that there is dialogue.*

That dialogue may be on paper, or may be through occasional face-to-face sessions between tutor and student, or may be organized through group discussion of one kind or another. But its existence suggests a change in the function of the teacher, the function of a teacher working in distance education is different from that of a classroom teaching. If the distance teacher is writing lessons; or making broadcast programmes, her function can be quite easily compared with that of a teacher standing before a class. But even here there are important differences: the kind of explanation which is appropriate to a class often needs to be transformed in one way or another if it is to be recorded. In just the same way as, to turn a play into a film, you need to do more than put a cine camera in the auditorium, so the teacher producing educational material needs to do something different from recording just that she says or does before a class. Once that job of recording the factual information which is to be used by students has been done, then the role of a teacher in a face-to-face session for distance students becomes markedly different from that of an ordinary teacher. She is no longer the means of passing on information; rather she is there to help students learn information brought to them from outside. That Copernican revolution is one that many teachers in regular schools already welcome. *Where a tutor meets distance students face-to-face, her role is changed from being a communicator of information to that of a facilitator of learning.*

Dialogue between a student and tutor is only one kind of dialogue. There is extensive evidence that, where distance teaching materials are available, students can help each other to solve problems which in an ordinary class they would put to their teacher. This is the normal method of working for distant students in farm forums or radio schools; more surprisingly, perhaps, children learning from television in Niger found that they could and would solve each other's learning problems when there was no adult present. In formal education, then, there is a place for class work or group work, along with distance study. Group work looks even more important in adult education. A whole range of group-learning projects, from the radiophonic schools of Latin America to the farm forums of Africa and India, confirm that group learning can be effective, and can lead to group activity. The finding is buttressed by communication theory: the two-step and multi-step theories of human communication suggest that we are more likely to adopt an innovation if we discuss it with friends or colleagues than if we simply learn about it individually and passively. The combination of local interest and knowledge, possessed by a group of people meeting together, and information from scholars recorded in print or on tape, is a potent one: *group discussion is an effective method of learning when distance teaching is used to bring relevant information to the group.*

Distance teaching, then, can be effective and can stimulate dialogue. Linked with group study, it can extend education far beyond the confines of schools or colleges and can be related to community needs and interests. It can do all these things cheaply. But it will not do so cheaply if we have to provide anew the schools, the libraries or the network of teachers or extension agents which orthodox education and extension requires. We need to use what is already there. And experience of many projects suggests that, in many communities, there are resources which are under-used. Tevec, a distance teaching project in a poor area of Quebec, for example, had as an explicit aim to enable its students to make use of its resources in the community, nominally available to them, which they lacked the knowledge or confidence to take advantage of. Obviously the resources available will vary immensely from place to place, from time to time, and in their relevance to any particular educational programme. *In most communities there are resources which can be used to support distance learning, to its educational and economic advantage.*

Methods

We started with 'method' in order to establish that distance teaching could face the major educational problems of access and of dialogue. But considerations of 'method' lead in another direction, too, into decisions about the best way of organizing distance teaching. If Statement is accepted, and a range of media are available to us, then there is no easy way of deciding which medium to use, in what way, for which purpose. But there is evidence to believe that several media are better than one. This may simply mean that to use more than one medium makes learning more fun, and therefore, perhaps, more effective, or that it enables information presented in one medium to reinforce that in another, or that individuals learn more easily from one rather than another. There is evidence that, in the United Kingdom, if we measure the proportion of people following a course, a multi-media approach is superior to one that relies on a single medium. *A multi-media programme is likely to be more effective than one which relies on a single medium.*

This does not solve our problems of choice. Distance teaching remains, for many educators and scholars, an uncharted area. We have very few years' experience of combining print, broadcasts and face-to-face learning in contrast with the centuries of experience of orthodox teachers, working with schools and books. We cannot - for better or worse - teach just as we were taught if we are to teach in a new medium; we need to plan to do something different. Experience so far suggests Statement 11: *a systems approach is helpful in planning distance education.*

The problems of students at a distance drive us on to three further statements.

We have already stressed the importance of dialogue to the student. But the benefits to the tutor are also important, and the problems for the tutor separated from her students are different from those of classroom teachers. Unless the tutor has some means of knowing how her students are working, she has no means of helping them and she cannot discover how successful are the materials she has created. *Feedback is a necessary part of a distance-learning system.*

Feedback can be of various kinds: the term embraces both feedback to the student, showing where he has understood or misunderstood, and feedback to the tutor or course writer. Some of the feedback to the student is immediate - if answers to questions in a correspondence course are printed at the back of the book, for example. But some is necessarily delayed and the distant student faces particular problems in learning by himself. It is peculiarly easy not to learn when studying by correspondence, or by following broadcasts. One can concentrate on the material, feeling that one is working hard, but remembering little of what one experiences. Even with generous opportunities for face-to-face learning, most distance study involves individuals working their way through material, and we cannot assume that tutorials will ensure learning. To help the student learn, the materials he is to use must be designed so that he does more than read or listen to them or watch them. *To be effective, distance-teaching materials should ensure that students undertake frequent and regular activities over and above reading, watching or listening.*

Feedback and active learning, the, are necessary for effective distance education, but a concentration on them does not answer the opening question about which medium to use for which purpose. If we group the media roughly into three - print, broadcasts (including recordings) and face-to-face meetings of any kind – then face-to-face communication has two qualities which differentiate it from the others. It makes possible immediate feedback between student and tutor, or dialogue between student and student, and its costs rise proportionately with the number of students, whereas economies of scale are possible with both print and broadcasts. It is this which, as we saw above, leads to central problems for us in reconciling the demands of education and economy. And it therefore suggests a paradoxical criterion for choice - to concentrate on the non-distant elements in order to design good distance teaching, and make wise use of all elements in multi-media education. Statement 14 therefore claims: *in choosing between media, the key decision on which the rest depend concerns the use of face-to-face learning.*

Another approach

We can look at all this another way, and state the argument more 'succinctly or set it out diagramatically, as in the figure. Educational media are similar in their effectiveness, but differ in the ways they can readily be distributed. This makes it possible to move away from the fixed staffing ratios necessary to face-to-face study, thereby changing the role of the teacher and making possible a reduction in costs. It is then possible to reach audiences different from the traditional ones, through distance teaching, and to do so at a reasonable cost. The equivalence of the media, however, presents us with problems of choice, best resolved by a multi media approach which allows for feedback and encourages active learning. In working out the approach to be used, the organization of any face-to-face element is of key importance and leads us to consider how to use distance teaching to ensure dialogue—something which is facilitated if a concern with new audiences and a new relation between education and the community lead to the use of groups as a basis for adult learning.

What is the use of it? And what is to be done? Is the construction of this sort of theory of any use? I'd suggest two tests for it. First, does it help anyone to see where and how distance teaching might be useful, or useless, for a particular educational job? Second, does the formulation of fourteen hypotheses suggest ways of testing them which would yield useful knowledge for practical educators?

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University-level Distance Education

'Distance education' is a form of education in which the students of universities and institutes of higher learning do not attend regular classes or lectures, but instead study teaching material especially prepared for this purpose by professors and their staffs together with experts in distance education – and interact indirectly with members of the teaching staff by means of technical media for the guidance and control of their learning.

This means that the distance between the living space of the student and their Alma Mater is not the decisive characteristic. It is true that this understanding of distance is applicable to most distant students – but not to the great number of regular students living on the campus who attend classes and study 'at a distance' as well, for instance, at many US-American universities. The term 'distance', therefore must be qualified in the sense that it means in the first place 'not face-to-face'. This means that the students are not pinned down to fixed times, places and persons, but are free to decide themselves when, where, what and how they wish to study.

Another important distinctive attribute of distance study is the *indirect* interaction between the university teachers and their students. This must be stressed, as many people believe that there is not communication between them at all. It is accomplished by means of letters, printed material, telephone calls, video and audio from lectures and classes at a university where this interaction usually takes place *indirectly*, that is, face-to-face.

There are four fundamental types of distance education in higher learning:

- *Type 1*: Distance education is accomplished by studying the printed material sent to the students by their university teachers, as well as by means of an exchange of letters between them, whereby the university teachers and their assistants correct the assignments and guide the further work of the students. This type was developed out of the traditional correspondence instruction and can be found especially in countries with long experiences in this field; for instance, England, France, the United States, Canada, Australia and South Africa;
- *Type 2*: Here, distance education type 1 is supplemented by regular and obligatory teaching-learning activities which take place face-to-face. It was developed in the Soviet Union and later introduced in eastern Germany. Variations of this type can be found in Japan, Sweden, Cuba, Mexico and Costa Rica. In extreme cases the face-to-face periods become so important that it becomes doubtful whether one can still speak of distance education;
- *Type 3*: Distance education types 1 and 2 are supplanted by lectures and demonstrations on radio and television. This multimedia approach has been tested in the United States and England;
- *Type 4*: Distance education is organized in such a way that a programmed computer performs important teaching functions. The type has been tested by the US Air Force.

There are two special developments of distance education: *Combined distance education*: Here two or three forms of study, each of which could lead separately to graduation, are incorporated in such a why that they form a new teaching-learning structure. In East Germany, for instance, it is possible to combine traditional tuition on the campus with evening study and distance education.

Group distance education: A number of students enrol in the same course of distance education and meet regularly in order to recapitulate, check and discuss what the have learnt by reading the teaching material. They are often called 'self-help groups'.

Distant students

No accurate information is available about the number of distant students. The statistical data which have been found are partially incomplete, and refer to different years and to courses of different lengths. They will be specified here only in order to give at least some indication as to how large the groups of persons are which will be dealt with.

As distance study differs from country to country in the same way as other forms of higher learning, it is difficult to describe the distant students in unified, general terms. However, it is possible to distinguish three types of them according to the goals and the duration of their studies. There are undergraduate, part-time and postgraduate distant students.

Undergraduate distant students tale courses in order to prepare themselves for graduation. We find them, for instance, in England, South African, the Soviet Union, Poland, Czechoslovakia, Hungary, Romania, Bulgaria and East Germany. As they usually have also to work for a living they must extend their study time considerably. Often they have to carry this double burden for five to seven years, and in many cases even longer.

Part-time distant student are to be found among the regular students of a university. They enrol for recourses the contents of which are normally delivered by professors or lecturers in one semester. This type of student emerged especially in the United States, but also in Sweden, Norway and the Netherlands. It includes regular students who had to discontinue their studies for health, family of financial reasons or had to go into the armed forces but wish to use their free time for studying single course at a distance until they are able to resume their regular studies.

Post-graduate distant students are graduate students employed in the professions who wish to enrol in distance education courses in order to continue their education. Up to now this group has been comparatively small. But there are signs that it will grow considerably in the years to come.

Distance education will mean different things for the distant students of these three groups, and this will affect their motivation and commitment. For undergraduate students, studying at a distance is a central life task which determines their way of living for a long time in specific way. If they drop out, their plans for a professional future have failed and they have to dispense with the vocational promotion they had in mind. For the regular students who enrol in only one or in several single course, the new learning experience might merely be an interesting episode. And for the professional employees who are continuing their education, distance study will be considered as an additional task which will not bind them very much, especially if they volunteered to study at a distance and think that they can postpone it for any length of time.

A surprisingly large portion of the distant students are teachers or future teachers. In East Germany, for instance, there were more than 10,000 teachers enrolled in distance education in 1965. In the USSR, there were more than 261,000 distant students enrolled in teachers training college in 1961. Large groups of teachers can also be found among distant students in the Netherlands, the France, in the United States and Australia, in South Africa and India. In Cuba, Costa Rica, Mexico and in the Lebanon all distant students are teachers -

as distance education was introduced in these countries just for them. The teachers studying at a distance can also be allotted to the three types described. In East Germany and eastern European countries they study mainly in order to pass the prescribed state examinations. In the United States younger teachers enrol in supplementary single courses. Postgraduate courses for senior teachers have been developed in Sweden, England and Australia. The number of distant students studying technical subjects is even larger. A third large group which has become more important in recent years consists of those persons who are studying economics at a distance.

Distant students are generally older than day students. In South Africa their average age is twenty-seven years, which means that on average they are seven years older. In the United States the average age is between 26.3 and 29.4 years. Most distant students belong to the age group up to thirty five years, but many of them are considerably older. In eastern countries there is an age limit. In western countries, however, it is possible to become a distant student if you are considerably older even that. At the University of Wisconsin, for instance, they have enrolled a seventy-year-old man and at the University of South Africa the oldest student was seventy-two years old.

As distance students are generally older than day students s greater portion of them are married and responsible for children. Experience has shown that married distant students are 'better' students. However, the years before and after their marriage are reported to be rather unfavourable for their studies. Female students often have to discontinue their studies for longer periods because they have had children.

The disadvantages of higher age, however, are compensated for b higher motivation. As distant students are more experienced in the world of work and in life, it is easier for them to judge the importance of graduation and continuing education for their professional development.

Tutors, in particular, confirm that their maturity is obviously a favourable conditions for the learning process and the general progress of their studies. If their study programme is related to their vocational work, their motivation can be supported in a unique way.

For universities and colleges the higher age of their distant students means that they are in the process of slowly becoming institutes of adult education as will, which will make considerable adjustments necessary.

As there are only a few distant students in the Federal Republic of Germany, misunderstan-dings are likely regarding their image. In this country it could happen that the traditional concept of the working student will be transferred to the distant student. This would, however, be wrong, as this concept refers to the exceptional case and to a low social prestige, neither of which applies to distant students in most cases. In the United States, the second large group, this concept would be wrong, as many distant students do not work at all whereas many of the day students are compelled to work for a living.

People often think that distance education is preferred mainly by outsiders. There cannot possibly be so many outsiders. In western countries, however, one can often observe that distant students do indeed take a special course, and differ from the majority of students. However, in the United States nobody has any objection whatsoever to distant students, as this form of teaching and learning has a long tradition in that country. Distant students are even more likely to be respected than scorned, although group life is highly regarded on the campus. The students and the university teachers hold that distance education is 'more difficult' and compels the distant students to deal with the subject matter longer and more intensely than is the case with day students. If they have successfully finished their course, their achievements are duly acknowledged - in spite of their special way of studying.

The status of distant students is also different in East and West, as the respective societies judge the importance of vocational work quite differently - mainly for ideological reasons. Whereas the necessity of working for a living is considered to be rather an impediment to university studies in western countries, it is appreciated as a necessary precondition for successful university study in eastern countries. Typical of the western attitude is the remark of a Canadian professor who said, 'Every encouragement should be given to all persons who desire to become better educated and more highly trained, particularly those who have sufficient zeal and ambition to learn while they earn.' Apart from the view that vocational work is such a great, but unavoidable, burden that it could be carried only by distant students with special qualities, these works convey an attitude towards distance students which still suggests a philanthropic benevolence. It would be worth examining whether this attitude is disappearing in western industrialized countries.

In eastern European countries distant students are systematically made conscious of the fact that they have an obligation to society which they are expected to live up to, an din government and communist party reports they are called the 'pioneers of a new socialist intelligentsia'. In addition, they enjoy considerable financial privileges, and this is the reason why the image of the distant student is much more clear-cut and positive in these countries.

Teachers

Whereas commercial correspondence schools are sometimes criticized because of the doubtful qualifications of their teachers, university distance education can rely on the high academic standard of their teachers as they usually have to have the same credentials as the teachers on the campus.

Because distance education can take place only when special teaching functions are performed and because it is organized at regular universities as well as at special institutes, it is possible to subdivide teachers in distance education into five groups, each representing a special type.

Type 1: University teachers who are responsible for their day students as well as for distant students. Their traditional field of activities, which is already very complex, is extended by the additional functions of being an author of teaching material and a tutor of distant students. Many of them like these new functions and endeavour to become excellent in performing them. Writing teaching material for distant students is new for them as it differs decisively from writing down their lectures. They no longer write for the day student in the class or the auditorium, but for the student who sits at home and tries to reach his goals by reading the texts. As it is necessary to use their limited time necessary to use their limited time economically, such teachers will have to calculate their approach very carefully and thereby realize the importance of new didactical perspectives which induce them to separate the two groups of students and deal with them to separate the two groups of students and deal with them in different ways. The function of a tutor of distant students is also new to such a teacher. It will call for developing further those guiding and counselling functions which are used when talking with the day students about their tests and seminar papers—a considerable educational task;

Type 2: Teachers at distance teaching colleges and at departments for distance education in universities. They deal with distant students only, which changes the profile of their work. It consists mainly of writing teaching material and tutoring. As they can specialize in these activities, they are more likely to develop new concepts of distance teaching of their own.

In the Federal Republic of Germany, professors and lecturers who deal exclusively with distant students are still unknown and do not correspond with the current idea of university teachers. In other countries, however, there are university teachers who even prefer this new form of teaching, as it certainly does not exclude research activities. This remains true, although an American professor for distance teaching, when asked about the difference between teaching day students and distant students, said frankly: 'I have to write more, to telephone more, to deal with more visitors and have less time for research';

- *Type 3:* University teachers who conduct seminars for distant students regularly. A typical representative of this type I the *Konsulent* in East Germany, where a considerable amount of distance education consists of obligatory face-to-face teaching. Generally, they are lecturers and readers working under the supervision of a professor. they perform a very demanding job as they have to combine and adjust principles of face-to-face teaching with those of distance teaching, which is difficult as there are no traditional patterns for this special teaching approach;
- *Type 4*: A professor who typically does not write any teaching material and does not correct assignments at all, but exchanges letters with a number of advanced students in order to guide and conduct their doctoral studies. There students usually live far away from the university and are working in the production process. At this level of university education the work of a student is already so specialized and individualized that regular courses will no longer do. Furthermore, these students are already so self-reliant and have become able to master the techniques of acquiring knowledge b methodical reading that they need professional advice which is given to them by their academic mentor. An experiment at the National Extension College in the United Kingdom shows that this type of distance duration can also be tried out and be successful at a lower level;

- *Type 5*: University teachers who assume responsibility for the management of distance teaching departments of institutions. They are confronted with tasks differing decisively from the corresponding tasks at conventional universities. Vice-chancellors and presidents, for instance, do not normally deal with teaching problems, as this task is dealt with by the individual professors or lecturers. The heads of distance teaching universities or departments, however, have to see to it that the contributions of all departments and sections can be guided and adapted in such a way that they fit together and elicit the intended learning effects. Furthermore, they have to keep complex technical systems going as the success of distance teaching relies on them entirely.

  The programmes of study of distance teaching departments and universities show that university teachers of all academic ranks contribute to it. Often the proportion of full professors is higher than at traditional universities, as they are responsible for the courses and often like to write them themselves. In addition professors from other universities are invited to participate in writing the courses. This indicates that distance education is by no means something which is accomplished merely at the level of lecturers and readers.

Often the question is discussed whether teachers in distance education should have qualities different from teachers on the campus. Ossian Mackenzie of the University of Pennsylvania thinks that they should combine scientific knowledge and intellectual capabilities with the rare gift to motivate and to guide. Charles Wedemeyer of the University of Wisconsin said that the distance teacher must be able to write efficiently, have a good sense of humour and, above all, be a good teacher. One might wish to attribute these qualities to every university teacher. It is, however, striking that opinions like these can be met very often. Presumably, particularly good teaching is expected from the teacher in distance education as a compensation for not having the students in the classroom. People might think that this 'handicap' can be overcome by special personal and methodical qualities. Perhaps teachers in distance education are also expected to be particularly good as they have to deal with adults calling for new and therefore unusual approaches to teaching.

Models of university-level distance education

If we examine university-level distance education in various countries of the world we can see that the special educational traditions and socio-economic conditions of these countries have led to individual models of distance education in each case. In spite of this, it is possible to identify two distinct, supra-national models of distance education if we disregard some particular developments and minor exceptions: a western and an eastern one. They differ with regard to their rank in national educational policy, the competent and responsible persons for it in the hierarchy of the university, the degree of their organizational integration into the university, and the methods of teaching and learning employed.

Rank in national educational policy

The rank of the two models in the national educational policy can be easily identified when we consider the reasons for establishing distance education. In western countries the universities originally intended to help certain fringe groups to take part in university studies. Here, they were very much in the tradition of private correspondence schools or colleges. They were aimed at the individual person who was prevented from attending university by adverse circumstances. The number of distant students was, therefore, usually relatively small. Hence, distance education was not an important issue with educational politicians. As a rule it was neglected in the same way as correspondence education.

In eastern European countries the situation was entirely different. Here, distance education was introduced and developed systematically by the respective ministries of higher education in order to increase the number of qualified specialists in many branches of the economic and political system. At the same time, the governments intended to provide for additional access to the professions for wider sections of the working people. Finally, the governments believed that distance education was a good example for reaffirming the ideological concept of the close connection of theory and practice. Such a high degree of political motivation and, above all, the enormous demand of highly qualified specialists meant that the number of distant students increased so dramatically in the fifties and sixties that they made up a considerable percentage of the students in the universities - that is, 20 to 50 per cent, and in some disciplines even more. Only recently have these high numbers of students been somewhat reduced. This does not, however, detract from the great political importance of distance education at universities in eastern European countries. Experts assure us that this form of university study has become a permanent part of higher education. Legally, it is entirely on a par with that of traditional university study.

Areas of responsibility

The different goals of distance education have also led to different areas of responsibility. In the western model the establishment of distance education rests usually with the departments of university extension or adult education. These departments decide the contents and procedures of their distance education themselves. The result can be highly differentiated programmes, as, for instance, at the University of Wisconsin and the University of Nebraska. On the other hand, one can also find meagre programmes with a small number of accidental and unrelated correspondence courses often administered by only one secretary.

The relative autonomy of these departments has a special negative effect, in that they do not coordinate their programmes with those of other universities. For instance, American universities have developed fifty-eight different courses for distance education under the title *Survey of the history of the USA*. Clearly, this goes against important principles of distance education, especially against those of rationalization and centralization.

The eastern European model of distance study, however, can usually rely on centralized planning and coordination by the respective ministries of higher education,which also adapt the distant study programmes to the requirements of the economic system. Sometimes central institutes have been established to prepare and distribute the necessary teaching and study material and to examine problems of teaching at a distance for the benefit of all universities.

Integration into the hierarchy of the university

The way in which distance education is integrated into the hierarchy of the university sheds some light on its relative institutional importance.

As has already been mentioned,in western countries distance education is usually organized by a section of the department of university extension or adult education. As these departments lack the academic reputation and the weight and power of the classical faculties or departments, this organizational structure is bound to be detrimental to the healthy development of distance education. The same can be said about universities which cooperate with correspondence colleges outside the university by using their course material as,for instance, the University of Lund. There,distance education is even less integrated. An extreme form of this non-integration of distance education can be found when the university limits itself to conducting final examinations only and relies on private correspondence colleges for the teaching of the courses. For a very long time the University of London was a good example of this approach.

In *Eastern* European countries the organizat-ional structure of distance education provides that most professors, deans and reactors of the universities have to be responsible for their distant students in the same way as for their day students. Quite often the universities even have special pro-rectors for distance study. In this way, distance education is fully integrated not only into the general teaching programme, but also into the hierarchy of the university.

A total integration is achieved in seventeen higher educational institutions in the USSR and in China. There, the entire faculty of the college caters exclusively for distant students. If we want to find out what a similar set-up would look like in a western county, we need only examine the University of South Africa, where there is a whole university which takes care of distant students only.

Methods of teaching and learning

There are also fundamental differences between the two models of distance education with regard to the methods of teaching and learning employed. A first structural difference can be derived from the fact that western correspondence schools have contributed considerable experience to the development of printed teaching material. It was taken over by universities and adapted to their special purposes. Over the last hundred years private correspondence colleges have accumulated special knowledge of how to teach at a distance, which could easily be systematized into a methodology of teaching by writing. However, the value of this methodology should not be assessed as being higher than that of traditional methodologies for face-to-face teaching based on common sense, pragmatic approaches and didactic recipes. Nevertheless, wherever western universities insist on a careful development of written special materials for distance study courses and on a regular correspondence between teacher and student, they profit by these early experiences.

Eastern European models of distance education, however, are not related to this tradition. Consequently, little or no attention is paid to the development of special teaching and learning material and to the regular, individual correction of test papers. Mostly, these elements are substituted by regular consultation periods at weekends, and b yearly seminars of several weeks' length. This may be considered as an adjustment of forms of traditional university study to the conditions of distant students. It was made under the unfortunate socio-economic conditions of the time after World War II. Hence, many measures were dictated by sheer need. The students were urged to work in full-time employment and to study at the university at the same time. The universities had to rely on the professors and the further teaching staff as well as on the infrastructure at hand. they used the same curricula and the same text-books which were provided for the say students. Hence, one could define the eastern model of distance education as a system of administrative measures which enable the universities to cater for considerable numbers of additional students who were expected to study mainly at home. This, of course, means that the eastern model is not derived from any elaborated concept in which the elements of self-study, regional consultation periods and yearly seminars at the university are carefully related to one another. Gerhard Dietze, a leading expert in distance education at the University of Dresden, deplores, for instance, the fact that 'the general scientific concept of distance education is inadequate and that, so far, its crucial components and their interactions in view of optimal learning conditions have not yet been analysed at all'. And Andrej Kamiac, a Czechioslovakian expert, explained that in his country distance education was introduced and developed by the administration of the universities and not by experts in teaching methodology.

Technological model of distance education

Reports from the United States, Sweden and Japan, and the planning papers of the Open University in Great Britain,show that at present a third model of distance education is becoming discernible. It is characterized by the calculated use of modern technical media—for instance, television, radio, computer and telephone, as well as audio and video tapes. This development changes the structure of the teaching and learning process to such a great extent that it seems to be justified to speak of new form of distance education, which I should like to call for the time being the 'technological model'.

The structural change can be seen immediately if one realizes that the use of these technical media confronts the teachers with new and difficult problems, as the contents of teaching and the teaching functions have to be redistributed if they change from the use of predominantly one medium—the correspondence course—to bi-or multimedia teaching activities. The new technical media force them to objectify longer sequences of their teaching. Careful, time-consuming and expensive preparations have now become inevitable. All the problems of planning the teaching-learning process, especially the division of labour between the teachers and media experts, and the organization and control of learning activities, assume a new importance.

Fortunately, the new model of distance study can profit from the 'technological turn' in the methodology of teaching which can at present be identified - mainly as a consequence of experiments with programmed learning. Today, it is easier to recognize the characteristic outlines of the emerging new model of distance education and to further its progressive elements than it would have been only a few years ago, because the newly developed 'educational technology' already provides us with a number of categories necessary for analysing and describing it.

Such assistance, though, cannot be expected from an educational technology which regards itself as the technical or instrumental side of the teaching-learning process only and attempts to reinforce it. Rather, we will have to look out for an educational technology which concentrates on the use of scientific methods and procedures for the planning, development and evaluation of teaching-learning projects. A. A. Lumsdaine, who described such an educational technology for the first time, said that it depends on the scientific disciplines related it in the same way as, for instance, the technology of engineering depends physics and the technology of medicine on biology. In short, the technological turn in the methodology of teaching and learning means that those process are to be explored and manipulated which can help to influence the learning situation.

Flechsing has pointed out that the technological turn in the methodology of teaching is brought about in five phases. In the first phase, the technical medium is used to stimulate the teacher, in the second phase this approach is given up and teaching techniques are developed in a rational way, which are optimized in the third phase. In the fourth phase, teaching techniques are coordinated with the help of systems approach, and in the last phase the development work is based on curriculum research and the duplication of teaching techniques.

It is important to investigate how the western and eastern models of distance education relate to these phases, and what the possible features of the coming technological model of distance education will be...

If we analyse the relationship of distance education to the five phases of the technological development we can conclude that it had a remarkable affinity to some of these phases long before this concept was developed. and, on the other hand, we can identify several features which do not yet correspond to these phases. In other words, distance education is partly a forerunner of educational technology and in part still lacks the specific technological development.

Such a partial delay need not concern or discourage distance education experts. It can already be considered to be remarkable progress that study can be improved as the technological model displays the standards of future developments in distance education. Only ten years ago the improvement of projects of distance education took lace more or less arbitrarily at best based on conjectures or according to the principle of trail and error. Even if money was available, one could not really identify the critical factors in the system of distance education which needed purposeful changes. The real contribution of the new educational technology is that now things have changed. It provides us with a system of scientific instruments and procedures which enable us to improve distance education systematically and also verify the outcomes. Even more: if we match a given project of distance education with the five phases of the technological turn its structural advantages and deficits become clearly visible. This is very favourable precondition for slowly raising the development of distance education to higher levels of accomplishment.

An additional advantage of the new technological model of distance education is that the techniques of planning, designing and optimizing projects in distance education can be favourable for the further development of distance study at university level.

Which of the three models of distance education will become dominant? We believe that the western and eastern models will continue for a considerable time, as they have already become a matter of routine and have also become a tradition. The technological model is much more demanding, as special experts, very expensive media and organizational systems will be required. For this reason, only a slow development can be predicted. In the long run, however, this model will permeate all endeavours of the teaching at a distance at university level.

18

Distance Education Curriculum

This chapter represents the results of our reflection on a specific innovation in distance education: the Deakin University Master of Education course 'ECS 802 Curriculum Theory'. As the reader will soon discover, the course was informed by a particular view of education and curriculum, but practice turned out to be something other than our theory envisaged, giving us the opportunity to improve the theory and our practice. In the following pages we give a brief outline of the structure of the course and offer an interpretation of some of the issues it has raised for those working on it over its five-year history. The chapter is organized in two major sections with a brief conclusion. The first section is a descriptive account, giving the background, rationale and brief history of the course from 1983 to 1987. The second provides an analysis of several issues which emerge out of the self-understanding of the course - a perspective which attempts to place the work and ideas of the course in a general curriculum context. In the conclusion we return to some of the central concerns which have structured, and continue to structure, the nature of the course as an examination of the curriculum problem.

The Curriculum Theory course is one of the about eighteen courses available within the Deakin University Master of Education and Master of Education Administration degree programmes. It is a whole-year course, valued are two semester units. The handbook outline for the course reads as follows:

> This course distinguishes theories of curriculum from theories of curriculum development, and introduces students to an approach to curriculum theory. Students read monographs introducing some 'conceptual furniture' for thinking about curriculum.
>
> The course is modeled on a professional association: the main work of the course is expressed through professional reading in curriculum (guided by a course bibliography), writing for other students in a course journal, and carrying out a project. Through this collaboration, the course community develops a critical perspective on contemporary curriculum theorizing and the conceptual furniture proposed in the monographs.

This outline introduces several point about the course: its particular view about curriculum as dynamic the idea of students learning as part of a community of scholars, and the idea that students should develop a critical perspective. These were initial aspirations about the course and after five years they provide a basis for a critical review. In order to do this, it will necessary at times to reflect on issues in a wider frame of social change, away from the specifics of curriculum and the course itself.

General background: 'The hope...'

To make a sense of the idea of a Masters level course taught in the distance education mode, it is first necessary to know something of Deakin University and its character as a provider of distance education. Of the four distinguishing features of the University noted in the 1988 *Handbook,* the following is given them most emphasis: 'but perhaps the most singular distinction is that it provides the option of either on-campus or off-campus study, being considered a leader in the field of distance education'. Established in 1977, Deakin University was invested with a charter for providing courses in a distance education mode; a model that had already been developed in the Open University in Britain. Deakin University started at a time of dramatic expansion of the tertiary education sector in Australia; thus its formative years were in a period of relative luxury for tertiary education.

In the late 1970s and early 1980s the School Education at Deakin University became involved in the development of postgraduate courses that were innovative in two senses: first, they were to be offered solely in the distance education mode; and second, they involved offering a range of fresh interpretations of the areas of curriculum, classroom process and educational administration. The course 'Curriculum Theory' aimed to be innovative in both these senses. In its development phase it was conceptualized as a key unit in a sequence of courses in curriculum in the Masters programme - one that would not only introduce students to curriculum as a field of study, but which would also help students explore recent developments in thinking about curriculum issues - the forms of theorizing and of reasoning which the literature increasingly regard as appropriate to content, problems and issues of the field.

The initial ideas about the 'Curriculum Theory' course were inspired by an increasing concern to explore the general patterns of thinking in the field of curriculum. Yet course team members found themselves caught in a unique dilemma: the course they offered was not only *about* curriculum, at the same time it *was* a curriculum. To avoid contradiction, the course would have to be quite explicit in exemplifying any curriculum ideas and principles it chose to advocate. Course team members realized that they could not offer just a guided tour of the literature of curriculum - a reading course which left questions of the 'livid curriculum' of the course to chance. It had to model a set of curriculum principles in its practice. The issue of theory and practice in curriculum was thus a real and compelling one for the makers of the 'Curriculum Theory' curriculum. Their own curriculum and curriculum development practice should provide a model of the practice of curriculum theorizing, and the course should construct a set of tasks for students in such a way that they, too, could encounter and engage issues of the relationships between theory and practice in their own curriculum work.

But the problem was not only one of exemplifying an agreed or accepted theory of curriculum in practice. As the recent literature of curriculum had shown, new views of curriculum theory were emerging in the field. The idea of 'theory' also needed to be made problematic. It was recognized that students might well find this unfamiliar and difficult; it could not be assumed that many, let alone most, had previously encountered the idea that, to construct a theory, one actually needs a theory of what 'theory' is—a *meta-theory*. In curriculum this means having a theory about the nature of curriculum theory. It means being able to distinguish different kinds of curriculum theories in terms of their theories of curriculum. In identifying the need for a discussion of meta-theory, the course team was acknowledging that presumption about the nature of curriculum theory and theorizing are potentially invidious, carrying sometimes unrecognized and unexamined assumptions about the nature of curriculum itself. Particularly at the time when the course was first mooted, the course team was aware that the terms of curriculum theory were changing - that the field was entering a new phases. These changes could be understood in terms of meta-theory so the course team regarded it as important to focus on meta-theory in order to offer an interpretation of the quite concrete, changing patterns of assumptions that characterized contemporary trends in the field.

A first aspect of the change in curriculum theory and theorizing could be discerned in its view of the central role of teachers in curriculum theorizing—in addition to their role in curriculum planning, curriculum change and curriculum realization. The emergence of a strong professional consciousness in the teaching service had been given structure be the trend toward school-based curriculum development and away from the central control of the curriculum processes by state education departments. In Australia this trend was the producer of a struggle be Victorian teacher unions for greater influence in curriculum matters as a 'terms and conditions' issue through the late 1960s and earl 1970s. They saw curriculum issues as of similar importance to other industrial issues, since curriculum matters so directly affected the nature and conditions of teachers' work. Outside Australia the trend had been fostered by British arguments for the centrality of teachers in curriculum research and development, for example, in the work of Lawrence Stenhouse, and in the United States by arguments for curriculum deliberation by teachers as a mode of curriculum theorizing, for example, by Joseph Schwab and Decker Walker. An awareness of these theoretical arguments and political struggles has led various Deakin researchers to work on the development of 'action research' as a modus operandi for those people at the front line of curriculum actualization - an approach which recognized the exigencies of specific social sites and the importance or the active participants in the work at those sites having control in the planning processes.

A second set of changes in the understanding of curriculum in the literature was the emergence of 'critical' theorizing about curriculum. At the time the 'Curriculum Theory' course was being planned, course team members were grappling with some of the implications of this view of curriculum theorizing in their own work. One source of this new 'critical' view drew on the insights of the new sociology of education' and the Marxian/structuralist work of people such as Bowles and Gintis in North America. Another source was more local; Deakin theorists of curriculum were beginning to explore the ramifications of the Frankfurt School of critical theory which had produced a critique of 'scientific' reasoning in contemporary social life; they had begun to make new connections between action research and ideology-critique in a conception of a critical educational science. These developing theoretical perspectives on curriculum, based on work at Deakin and elsewhere, when combined with the awareness of the impact of the school-based curriculum development trend, provided some fundamental ideas for a course about curriculum.

In 1981-1982 the course team began serious work in preparation for teaching 'Curriculum Theory' for the first time in 1983. They were assisted in their work by consultants appointed to bring particular expertise to the development of the course. These consultants were the late Professor Lawrence Stenhouse and Dr Jean Rudduck, 5 at that time members of the Centre for Applied Research of the University of East Anglia in England, and Professor Ulf Lundgren from the Department of Educational Research of the Stockholm Institute of Education in Sweden. Stenhouse and Rudduck brought with them a great deal of experience and insight into the matters related to thinking about the roles of teachers in curriculum research and development; Lundgren brought with him ideas emerging from the Marxian inspired theorist of social reproduction. These three people provided perspectives which, when combined, picked up on two of the major trends in thinking about the curriculum of the time.

In a deliberations with the course team Stenhouse Rudduck explored ideas related to students thinking about curriculum within the context of their particular forms of teaching practice.6. This notion developed from the attempt to hold the theory/practice relationship together and to avoid the separation of these elements which characterizes many postgraduate courses. From the outset the course aspired to develop approaches which helped teachers and others to articulate and elaborate ideas and issues based on actual teaching situations. Stenhouse and Rudduck thus provided a subtle but significant shift in the self understanding of the course - a shift 'theory' to *'theorizing'*. On the basis of Stenhouse's previous work developing the nation of the teacher as an 'extended professional'. the course team began to explore ways in which the course could support the development of extended professionalism in its students.

The action-based approach to studying one's won work context provided a fundamental statement of principle and a practical basis for the development of the pedagogy of the course. One of the ways this orientation to action came to be enacted in the course design was in the notion that students would conduct *projects* in which they explored their own work and working situations. it was also to be enacted by making the theorizing required by these projects public. Research is systematic enquiry made public. It is made public for criticism and utilization within a particular research tradition. In keeping with this definition Stenhouse and Rudduck advocated the development of an information exchange forum within the course and, given the nature of the distance education situation, in which students would not have direct contact with either their peers or tutors, the idea turned out to be extremely important for the pedagogy of the course. It took concrete form with the development of the idea of a *Course Journal*.

The idea of the 'Curriculum theory' *Course of Journal* was regarded as significant not only because it could provide a medium for students to exchange ideas. It also offered the possibility of enacting Stenhouse's notion of 'academia as a social system for the production and utilization of knowledge through research'. A journal offered the prospect of collaborative exchange in which course team members teaching the course could enter the forum on a more equal basis with students. For this reason there was some spirited discussion in the course team about whether and how it should operate as an 'editorial board' for the journal. Would it accept all student submissions? Would only those submissions be published which seemed particularly meritorious? In the end it was agreed that all student work should be published, but that all work should be checked against explicitly stated criteria of acceptability. Work which did not meet these requirements would be returned to students for resubmission. On this model of the journal, with the course team operating as this particular kind of editorial board, it was thought that the journal could become a medium for declaration and dialogue between students and course team members. On this basis, perhaps staff and students could exchange ideas as a *community of enquirers.*

Working from this image of the course as a community of enquirers, the course team began to consider the course on the model of a professional association, in which members contributed to and received a journal, but also participated in an *annual conference* at which they read and discussed papers face-to-face. The ideas of the journal and the annual course conference thus became central to the pedagogical design of the course.

Ulf Lundgren's contribution occurred after that of Stenhouse and Rudduck. As noted previously, he brought with him an interest in understanding the curriculum in terms of relationship between schooling and society. Lundgren's work had left into a way of thinking about the structure of the curriculum in terms of its relationship to the economic mode of production in a society. In this sense his was a classic Marxian approach one that formulated a way of thinking about social instructions in terms of their relative positions in the base/superstructure framework of Marxian thinking. His analysis was fresh and powerful. It built on emerging tradition of a critical or conflict approach to thinking about the structure of the curriculum. While Rudduck and Stenhouse had greatly influenced the course teams's ideas about the pedagogy of the course, Lundgren's contribution was especially important in giving focus to the content of the course. It was agreed that he would write a monograph for the course as a statement of his theoretical ideas about curriculum which could, on the one hand, problematize the field and the notion of 'curriculum' for students, and, on the other, provide a common point of reference for students and the course team in their own projects, reflection and writing.

Curriculum is to be understood as part of the social and historical process by which the social relationships necessary for production are reproduced.

On the other hand, the phrase 'text and context in curriculum' captures the dynamic of processes of social formation, some of whose traces can be read in curriculum, both as an historical artefact and as an historical force-shaped by and shaping history.

Lundgren suggested that the problem of curriculum could be thought in terms of social necessity of sustaining a society's basis of production through reproducing—passing on to rising generations—the knowledge, skills, practices and social relationships needed for production. He argued that curricula are one of the ways in which the gap between production and reproduction is bridged. People wanting to ensure the future of existing means and modes of production must select and decontextualize the knowledges, skills, practices and social relationships required for production from the context of production, then recontextualize these knowledges, skills, practices and social relationships in forms suitable to the needs, traditions and patterns of work of the settings in which reproduction occurs. The result of this process of selection, decontextualization and recontextualization are curriculum. Curriculum thus embody ideas about how production can be related, and about how rising generations can be inducted to the forms of life generations that have gone before. As such, curricula are important historical documents, providing evidence about the ways in which societies understand themselves—evidence about what aspects of production a society regards as so important that reproducing them cannot be left to chance.

According to Lundgren, the development of curricula is a continuing struggle to develop 'texts' which adequately represent the knowledge, skills, practices and social relationships needed for production in the context of reproduction, thus bridging the gap between material production and social reproduction. On this view, the central problem for *curriculum* is thus '*the representation problem*' — the problem of adequately representing the knowledge, skills, practices and social relationships needed for production in forms which can be taught and learned. When a group or a society resolves this problem for itself by developing a curriculum, it reveals something significant about itself—it reveals the way it understands the relationship between production and reproduction, and the relationship of rising generations to previous ones. When people studying curriculum reveal these understandings, they begin to unravel a society's underlying theories about itself, its economy and its culture, about the nature of education and schooling, and about the relationships between them.

From this analysis, Lundgren argues, it follows that the central problem for *curriculum theory* is the problem of finding the theoretical means to interpret different curricula in different cultures and societies in different epochs — by interpreting them as texts which, in their own ways, for their own times and settings, reveal specific ideas and theories about how the specific needs and contexts of production (for example, in the economy) are thought to be related to the specific needs and contexts of reproduction (for example, in schooling). If every curriculum reveals a specific theory of the relationship between production and reproduction, then the task of curriculum theory is to develop general theories capable of understanding and explaining the specific theories which inform specific curricula. In this sense Lundgren regards the study of curriculum theory as meta-theoretical.

Lundgren's ideas, when placed beside those of Stenhouse and Rudduck, helped provide a general conceptual framework for the course. Stenhouse and Rudduck had provided the basis for the primary pedagogical considerations of the course, while Lundgren had provided the primary theoretical questions. At the same time the course could also understand itself in the terms of Lundgren's theoretical framework as aiming to produce — or reproduce — a different kind of teaching force in Australia: one committed to what Stenhouse described as 'extended professionalism'. The course team understood itself to be selecting the critical curriculum theorizing and practice of some teachers and teachers' organizations, and preparing a pedagogy capable of reproducing this extended professionalism among its students as a rising generation of curriculum theorist-practitioners. The way these two dimensions came together can be seen in an image provided by a short comment in the *Study Guide* produced for the first offering of the course in 1983. The statement read: 'The long term aim of the course is to help you change the way you do things in the light of what you know. This major aspiration of the course was given a structure by the ideas and suggestions of Rudduck, Stenhouse and Lundgren, but it is equally important to recall that the perspectives of these people were set against a stream of research and theorizing by Deakin researchers over the preceding years. That is, the ideas built up in the planning phase of the course were set down on a foundation of several years of work that related to different aspects of the problem of the curriculum. This point is clearly demonstrated in the following extract from the 1983 *Study Guide:*

> In terms of historical and political processes which produced the *Curriculum Theory* course, it is a product of a continuous line of development in the work of Deakin staff interested in curriculum — a development which has taken place over the last few years. It has involved research on teacher action research, long-term in-service work with teachers helping them to develop a critical perspective on their own practices, and a great deal of critical reflection on our own teaching practices.

At a more concrete level the work of the course team, in the planning phase, can be characterized in terms of the agreement reached on the key ideas or propositions of the course and the actual structural components of the pedagogy of the course. These were described in the first *Study Guide* which presented students with four key propositions and one supporting theme, a composite list which provided the surface text of the theoretical aspirations of the course:

1 Any curriculum (text *for* pedagogy) or any curriculum theory (text *about* pedagogy) is a unique product of the *historical and political circumstances* and processes which produced it;

2 Any curriculum or curriculum theory expresses particular values and value systems; implicitly or explicitly, it expresses a social and moral philosophy. By examining these value commitments and the social relationships which support them, we may identify the *ideological* aspect of the curriculum or theory;

3 Any curriculum or curriculum theory likewise takes an implicit or explicit stand on the nature of knowledge. By examining its perspective on subject-matter (of learning or of curriculum theory) we may identify the *epistemological* aspects of curriculum theory;

4 Any curriculum or curriculum theory expresses, implicitly or explicitly, a view about the organization of teaching and learning. A curriculum theory therefore, is also a theory about *pedagogical* action.

A fifth point, which emerges out of these four, was that a dialectical conception of theory and practice could assist students to develop a platform for *critique* in which action and understanding could be seen as mutually constitutive, constantly and critically informing one another.

The pedagogical structure of other course was designed to permit students to explore these five points critically and self-critically in their own day-to-day practice as well as in the work of the course. It included:

1 the production of a *course journal* based on contribution from all course participants (students and course team) in several distinct 'departments' (*theoretical articles* addressing the 'conceptual furniture' of the Lundgren monograph, *activity reports* through which students reported on their explorations of the key propositions of the course in their own practice, contributed *abstracts* of

reading done for the course, and *correspondence* with other course members about their contributions);

2 the holding of an *annual course conference* at which papers would be presented and discussed;

3 *project work* by course participants which would permit actual curriculum theorizing undertaken in participants' own curriculum settings, with a major project to be conducted throughout the year and reported on in a project report, and smaller-scale investigative activities (perhaps contributing to the major project) to be carried out along the way and reported in the *Course Journal* and at the conference; and

4 engagement in a wide range of *reading and reflection* on curriculum as a basis for reflection both on one's own practical activities and on theoretical ideas being discussed in the *Journal*.

Being constructed on these pedagogical principles, the 'Curriculum Theory' course set itself against the view that it is the task of teachers to present a 'correct' view of the subject matter of a course, or a variety of competing but more-or-less adequate views. In this way it challenged a conventional liberal view, widely held in universities since the Enlightenment, that a variety of competing, more or less adequate, views of a subject should be presented so that students can choose among them. This Enlightenment view may seem to be important in any course which aims to be 'critical'. In practice, however, the presentation of alternative views in many higher education courses if frequently no more than a manifestation of the 'marketplace' notion of debate criticized by MacIntyre. On the 'marketplace' notion staff frequently present views without sufficiently engaging the arguments between them and sometimes distort their presentations s o that their theoretical preferences are clearly implied even though insufficiently justified by argument). Similarly students are not compelled to argue the strengths and weaknesses of competing theories; a choice between them is regarded as a matter of private conviction, not public justification. In such cases the substance of points of view is regarded as separate from the substance of arguments for and against them ; by this means the process of debate itself, through which the compulsion to support or reject views is secured, is made secondary, and 'holding' views is treated as more significant than sustaining them through argument . For such reasons the 'Curriculum Theory' course constructed itself as a 'community' of enquirers', creating a journal and a conference, and requiring correspondence between students. For such reasons also it prescribed the Lundgren monograph as a focus for debate— as a proto-theory to be tested against students' views and the views of the literature of curriculum. The course was thus to be constructed through critical and self-critical debate in which students would be required to argue about the strengths and limitations of Lundgren's views, the views of the course team and each other's views. Their commitment to the debate would be secured by making their own practice a source for and an object of their enquiries.

The description of 'Curriculum Theory' so far has given some background to the development of the course for its first offering in 1983, illustrating some of its major assumptions and its strong sense that it should be explicit about its own pedagogy as a curriculum about curriculum. It describes features of the course that were themselves to undergo change in the light of experience of the course in practice, when its 'hopes' became — or did not become — 'happenings'.

A Description of Five Years of ECS 802: 'The Happening...'

The first number of the *Course Journal* was prepared by the course team and some other people, such as David Hamilton from Glasgow, who might be described as an 'outer circle' of 'associate members' of the course. It was a primer, one to be set up as a starting point for the sort of contributions which were anticipated from all course members. The protocol for student publication involved submission of articles to a tutor who would determine if the pieces satisfied explicitly stated course requirements for journal submissions. If there was any doubt about the standard of the work submitted, it was to be second-checked by another tutor and returned to the student with recommendations for rectifying the particular problems. In this sense the course team was to function as an editorial board. The difficulty in entering into the sort of public exchange anticipated by the *Journal* structure is captured in the words of one of the first contributions in Volume 1, Number. The statement commenced with the following remark:

It is not clear if this statement represented the view and emotions of other course participants. People wrote articles about theoretical issues, about their attempts to interpret the curriculum activities they were engaged in, about the books and papers they were reading *and* about their reactions to other people's ideas (as reported in previous *Journals*). The *Journals* came out on a regular basis and information started to filter across the various departments (theoretical articles, activity reports, abstracts, correspondence). People wrote about Lundgren's monograph and started to move around the various pieces of his 'conceptual furniture'. Lundgren's proto-theory provided the common reference point for placing curriculum issues in a wider context. In August 1983 a course conference was conducted in which people who had known each other only abstractly, through their journal writing, met each other and talked in person. Fifteen people attended, including some invited speakers. Those people unable to attend submitted 'display papers'. The forum provided a significant extension to the theme of the course, giving it a moment of life and vitality that is important in all forms of education.

Looking back at the entries in the *Journal* in 1983, one can detect a sense of the long-term patterns of concerns which were to emerge time and again in subsequent years. The following comments lifted from Volume 1, Number 4 (the final issue of the first year of the course) are indicative of trends and concerns which were to become consolidated in subsequent years. For example, with regard to the Lundgren monograph: 'The more I am working through this course the more restricted I am beginning to feel having to use Lundgren's furniture. I feel the meanings of some of the terms he uses are too narrow, or fluctuate'. A different type of comment, but one that clearly related to the philosophical underpinnings of the course, noted the following concern:

> To my mind the real reason for the reactionism emanating from the course developers is their inability to appreciate that although this course is based in materialism (which they acknowledge) they have been prepared to accept material from participants who do not utilize materialism's philosophical underpinnings. This does not mean that course participants must believe in materialism, rather I am expressing the view that argument put forward in course material must be based in support or attack of that philosophy. However, what has been obvious from the first articles in the Journals is writing based in Platonic idealism but lacking a perspective critical of the Marxist materialist view.

Comments like these raise questions about the epistemological framework of the course and its pedagogy, especially its notion of the course as a 'professional association'.

At a different level other comments point to a different type of reaction, one that aligned more closely with the *hope* of the course team and, in particular, to the ideals espoused by Stenhouse and Rudduck. This point relates to the opportunity afforded by the course structure to take apart and reassemble one's particular context of work.

> What has appealed to me is the valuing and recognition of my everyday knowledge about curriculum by the course team and other course participants. This affirmation via the journal, curriculum conference and tutor's comments has

encouraged me to lay out more of my practice for scrutiny and in so doing has given me greater control over it.

Not all students had such a positive reaction to 'Curriculum Theory', of course, and course team members were not uniformly satisfied with the quality of students' work.

In the latter part of 1985 a review of the course was conducted by Terry Evans from the Deakin University Distance Education Unit. This evaluation provided insights into both the theoretical scope and the pedagogy of the course. Evans discovered a high degree of confusion and apprehension amongst the students he interviewed. In his words, '... the most important single point about the students was that they were not expecting the sort of course that they received'. The largest cause of this confusion, in his opinion, was students' lack of familiarity with the neo-Marxist perspective and/or the history of educational thought. This particular concern was most manifest in having to work with the Lundgren monograph. Evans noted that 'the monograph represents the central component of the course and is also the location of most of the problems for the students'.

Staff were running into difficulties too. In the area of the course pedagogy there were many concerns associated with the trials and tribulations of turning course material around in sufficient detail and time to be meaningful. The process required that tutors read and check submissions against course requirements, decide whether they could be published as they stood or whether resubmission should be required, hand over material to be published to a course assistant who would collate, paginate and index the material, send it off to the University's Printery for reproduction, and ensure that it was sent out promptly to students. The process, while administratively routine, was easily disrupted. Tutors much be away at the time material was received, arranging the first check of material against course requirements might take longer than the few days allowed in planning the process, second checking adds time to the process, compiling the material might be held up by late student submissions, and occasionally delays could occur when the University's Printery or mail-out facilities were unable to process the material speedily. Alongside this production process, tutors were expected to respond to students' work individually, offering suggestions, advice and evaluative comment. This assessment process was also demanding, since students' work varied greatly with their individual interests and work settings, so no marking could be considered 'routine'. Through the year students were submitting as many as fifteen pieces of work, varying from one-paragraph abstracts of *Journal* articles to substantial project reports. The assessment load was thus substantial in quantity and demanding because of the rather relentless course schedule.

One of Evans' concluding comments provides a summary for the first few years of operation:

> The task of constructing a critical community at a distance is no mean challenge. From the evidence of the present group of students it has not been achieved, but there has been some progress. For example, almost all the students said that they did not feel that they were members of a *Curriculum Theory* critical community—one said that the feeling was of a 'sense of loneliness on the course'—but several students did feel that they were more involved with each other than in other distance education courses at Deakin or elsewhere. These points are worthy of some elaboration, for they pull into sharp relief the different elements of this course. The substance of Evans' analysis will be developed further through the ideas and observations of one of the students of the course who, in the pages of the *Course Journal*, provided some telling insights into the life of 'Curriculum Theory' as a course for students.

In 1986 one of the students, Rigmor George, conducted a continuing critique of both the course in general and the Lundgren monograph in particular. He comments neatly encapsulated concerns expressed by some students and the course team:

Critical meta-theories

Now it is this context that ECS 802 is presented. Not only is it dealing with meta-theories of education, it is itself a product of one of them. Not only is it altering us to the ideological implications of curricula, it carries with it its own ideological message.

George notes that a 'critical theory approach to curriculum' is one that'... maintains the issues are political and related to the much wider and more pervasive social theory which is capitalistic'. Her comment exposes a major point of contention about the way the theory and pedagogy of the course are interrelated. Her concern was that the critical meta-theory, as represented by Lundgren, failed to say enough about the complexity and richness of human experience. She opens up this concern with the question, 'What is this proto-theory saying about human beings?' She expressed the more substantive point thus:

> The most fundamental question - What is the nature of our 'humanness'? — will determine the direction our education 'system' will take. It is at this level we see a basic problem with the theory. Society's views on humanity and the means used to assist the growth and development of that quality are so divergent that it is not possible to provide educational curriculum which can openly and honestly accommodate the different world views which generate them.

The full implication of this concern goes back to the point made earlier about the expression of humanness. The critical meta-theoretical position calls forth a communication ideal — the idea that the course can be in some concrete sense a living community. But such an ideal usually rests on the notion that members of the community can interact face-to-face. Distance education challenges this basic assumption. The attenuation, intangibility and transience of relationships in the distance education mode make the communitarian ideal highly problematic.

> We need to learn a new role of relating to each other as colleagues. Relationships of any sort are delicate, complex affairs.... Let's build on the relationships. Perhaps personal individual relation-ships would work better—phone calls, in person conversations, and letters between students might be a good idea.

The idea expressed here has been the concern of a number of students other than Rigmor George; and their concerns are legitimate. What comes into question is the very frame we use to think about this issue. Using ideas lifted from the times and places when education was always intimate and face-to-face does not help in our understanding of the form of social relationships which are increasingly separated and distant. This is the substantive curriculum question of '*Curriculum theory*' and other distance education courses. Among the course team, at least initially, there was a tendency to see the issue as a problem of a 'theory/practice gap'; one in which theorizing is done in one context and practice in another. Some may see this as a technical issue in which the challenge is to find a technical and bureaucratic solution to the delivery of educational ideas. This approach accepts as fundamental a distinction between theory and practice. Others, however, regard a distinction between theory and practice as committing one to false dichotomy. Such people attempt to demonstrate in the design of courses that theory and practice are mutually constitutive. On this latter view the so-called 'gap' is treated as a matter of logical inconsistency. Many of the arguments associated with 'Curriculum Theory' have been set within the limits of one or other of these positions, embracing different dimensions of arguments that have held away in earlier times. Lundgren's insight into the 'representation problem' is one way of characterizing the parameters of the theory/practice issue, at least to the extent that Lundgren's view of meta-theory puts the theory/practice issue on the agenda of curriculum debates. The debates in the pages of the *Course Journal* have generally utilized a limited range of perspectives for thinking about the substantive problem of the curriculum, but in doing so they have remained wedded to the ideas of a bygone era. They have accepted as fundamental the distinction between theory and practice in ways characteristic of the curriculum, theorizing that developed and tool root in an earlier period of curriculum theory. What is required now is a fresh perspective on the curriculum issue. In words reminiscent of Geothe's views of 150 years before, the contemporary Australian curriculum theorist Doug White wrote: "Thought and action, intellectual and material production are inextricably linked in the modern world ... The issue before us is not whether intellect and action are combined, but on what terms'. The final part of this section will highlight the attempts within the course to move towards such an understanding.

In 1986, partly as a result of the survey conducted by Terry Evans, we decided to introduce a second monograph, *Between Hope and Happening*. This second monograph developed an argument about the changing the meta-theoretical commitments of several key curriculum theorists of the last forty years, to illustrate how and why the 'critical' position of some contemporary curriculum theorists had emerged. The importance of this new position, it was argued, is that it has not only put new issues on the curriculum agenda, but it has also required new social relations and forms of organization among curriculum workers for these issues to be addressed. These social relations of curriculum theorizing recover theory as an equally central concern for curriculum practitioners in schools and classrooms as for curriculum policy-makers and designers outside classrooms. This focus on the social relations of curriculum production was, of course, simply another reflection of the trend which had set the scene for the emergence of the 'Curriculum Theory' course. At one and the same time the course acknowledged the contested nature of the curriculum and asserted the legitimacy of the teacher's role in these contests. The pedagogy of the course was one which set out to draw this conflict and debate into the open, making it public through the *Course Journal*. The course thus put itself at odds with the conservative view of curriculum which assumed or asserted that curricula could and should reflect a social equilibrium, and it did so by making debate a material feature of the life of the course.

While the course was constructing this form of life for itself, however, there were important shifts taking place in the culture more generally, and the course was far from immune to them. The course had arisen from a context in which there had been a long struggle among Victorian teachers for a greater say in curriculum matters, and it aimed to extend that struggle to the domain of curriculum theorizing. By the late 1980s, however, the course found itself operating in a very different climate, in which the achievements of teachers in their struggle towards greater control over their own curriculum practice were being eroded. There were increasing signs that the state was once again exerting a more active control over the construction and legitimation of curricula – for example, in the reconstruction of curricula to meet the demands of a changing economy.

In the view of the course team, the 'Curriculum Theory' course could not be regarded as immune from these more general shifts; in higher education, as much as in schooling, the state and the economy were imposing new demands on the curriculum. The 'Curriculum Theory' course, with its particular theoretical bias and pedagogical emphasis, could be a forum in which this shift could be addressed and interpreted. The confusions over the theoretical perspective adopted in the course and its relationship to the course pedagogy noted in Terry Evan' course evaluation can be understood quite concretely in addressing this confusion. The course team was committed to modelling critical and self-critical curriculum debate through the practice of the course. Unlike other courses whose curriculum is more 'closed', the 'Curriculum Theory' course aimed to remain 'open', to allow students to debate an explore issues. Perhaps for this reason some students found the course confusing. In coming to grips with such issues in its own pedagogy and its own curriculum, members of the course, both staff and students, attempted to explore formative ideas and value positions in a rapidly changing social context. In the next section we will return to explore this issue in more depth.

To summarize: in the volumes of the *Course Journal* over the five years from 1983 to 1987 there are numerous examples of work where people have managed to analyse and interpret a wide range of curriculum issues relating to different educational spheres. In this sense the course has staked a genuine claim in the territory of curriculum theory and as a component of the idea of distance education. A brief elaboration of the different perspectives developed, highlighting an emerging thread which has held the practice of the course together, would confirm this point. Yet to do so risk remaining on the surface of the activities of the course and taking different participants' views of the course at face value; beneath this surface, between rather than on the lines of its next, however, an unfolding logic can be discerned. This unfolding logic shaped, and continuous to shape, the cultural foundations on which the ideas of the course are constructed. As we have attempted to show, the course strove to make students aware and active in their roles as curriculum workers, not simply as cogs in the machine of social reproduction, but as the producers of curriculum, and through show, the course was only partially successful in achieving this aim. The 'hope' was yet unrealized in the 'happening'.

Nevertheless, the course team retained the 'hope' of enacting the view of curriculum workers as the producers of history in a communitarian practice.

This is no easy task. Changing social relationships to allow curriculum workers to enact this emancipatory ideal requires not only changes in the social relations of schooling but also new kinds of interpretation of curriculum work and the social condition. These changes must occur not only in schooling but also in the construction of courses about curriculum. Reflecting on our emancipatory aspirations in the light of our analysis of the 'Curriculum Theory' course, we have come to an understanding of a new dilemma confronting the course: the dilemma of creating *a communitarian* practice in *distance education*. This is a dilemma to be faced by a variety of groups aiming to enact a critical view of distance education, not just for members of the Deakin 'Curriculum Theory' course.

Our account of the first five years of the 'Curriculum Theory' course has highlighted concerns about the course which point to a confusion about expectations about the nature of distance education generally and the study of curriculum specifically. The analysis to this point has concentrated on establishing a warrant for a new perspective on the nature of the curriculum problem for people whose work is the production of curricula and, through curricula, of the social relations and social life of society. Through the course is still far from exemplary in achieving its aims, we have attempted to argue that its steps towards a collaborative, communitarian practice of curriculum critique and curriculum production are at least suggestive of models of curriculum work appropriate for a society in which people can legitimately see themselves as the producers, not just the products, of history. Our reflection on the history of the course has revealed a potential contradiction between the practice of distance education and the collaborative, communitarian practice which the course aimed to foster.

In the modern world absence and presence, the concrete and abstract, are united in radically new forms. The global satellite network, new innovations in telecommunications and the spread of computer technology have collapsed the time and space boundaries that previously structured social interaction. Modern jet transport permits travel to most corners of the globe in a relatively short time. The geographic and cultural divisions between north and south, east and west have altered dramatically during the latter part of this century. This new level of social exchange has been called the emergence of the 'information society', 'Curriculum Theory', as a distance education course, is itself an expression of the expansion and diversification of the 'information society', attenuating and straining the social relations of education as they have been understood in previous times. The new cultural situation is one in which ideas and action become radically reconstituted and produce the opportunity for new forms of social interaction *and* the need for new forms of theoretical interpretation. In what follows we attempt to sketch the outlines of an interpretative alternative.

The general curriculum problem introduced here holds the clues for an interpretation of ECS 802 'Curriculum Theory'. The monograph is at pains to point out that a number of theoretical perspectives collide and confront one another in contemporary educational debate and in contemporary curriculum theorizing. But this image of contested positions actually begs the question as to which theoretical position provides the greatest interpretive power.

The 'post-industrial' or information society is constituted around the convergence of new social associations. We need think no further than the course described here to understand how this new level of associations comes into being. Distance education works on an assumption of establishing and maintaining continuing contact despite the 'class' members being thousands of miles apart. The assumptions here are supported materially by the capacity to exchange information quickly and over vast distances. The long distance associations of the modern world are directly linked to the extended market relationships that stretch relationships away from the former face-to-face relations that characterized the clan and kin associations of former times, the village relationships of pre-industrial society, and the class relationships that existed in the industrial communities of the late nineteenth and early twentieth centuries. The extended market logic of contemporary Western society envelops the predominantly concrete relationships of family and neighbourhood and school, and locates them in a matric of abstracted functional relationships characteristic of the modern state and its increasingly transnational economic structures. Increasingly, in our formation as persons, we carry our sense of primary attachment to others in our families and neighhourhoods into this more abstracted realm of functional associations—for example, through informal relationships with others in the workplace, through our use of the new telecommunications media and through the identifications we make with political and cultural identities known to us only through television. The data highlighting the time that children spend watching television provide just one example of evidence to support this trend.

Education has become directly involved in the transformation being discussed here. Schools, colleges and universities have become an aspect of the 'information revolution', in helping to provide the skills and develop the predispositions associated with the more complex juxtaposition of abstract/concrete relationships. The increasing stress on exposure to different forms of print media and computer hardware and software, coupled with the contemporary return to pedagogues of problem-solving and discovery learning, are indicators of education's role in the new level of social transformation. The changes in social relationships in education (and elsewhere in society) are not confined to the development of these new communication technologies but also appear in technologies of social and educational administration. The trend has been recognized since Weber. In bureaucratic models of social organization and management, persons are construed not as common bearers of a shared culture and shared circumstances, but as 'individuals' dominated by the pursuit of private modes of consumption and gratification. While 'autonomy' is lauded as a primary social value, in fact people find themselves cast as objects (rather than subjects) - as employees, to be managed and controlled like other elements in production processes. In his eloquent critique of the rise of modern, bureaucratized forms of consciousness and morality, MacIntyre expressed it this way: 'the society in which we live is one in which bureaucracy and individualism are partners as well as antagonists'.

MacIntyre argues that contemporary social life does not perspectives on the world characteristic of a sense of 'community'. Our moral and intellectual debates can no longer presuppose the forms of sharing on which fundamental agreements can be based, sufficient to sustain us through debate to mutually agreed conclusions. Instead, contemporary culture takes a 'marketplace' view of debate, in which people feel free to select the premises and conclusions which best suit their views and interests – and suffer the consequences in interminable disagreements. The burden of MacIntyre's argument is that we need to re-establish such forms of community. To do so, he argues, three things are necessary: (1) a sense that our social (and educational) practice are cooperatively agreed, embodying shared values and excellences, (2) a common sense of tradition against which the excellence of practice may be judged, and (3) a sense of 'the narrative unity of a human life' – the sense that a person's life can only be judged from the perspective of her or his death as having embodied a striving to enact particular values. The unity of these three features in the social life of earlier times, he argues, has been fragmented be contemporary conditions. Referring to the great theorist of bureaucracy, Max Weber, he says, 'We are all Weberians now' – meaning that our sense of being and belonging through communities in civil society has been replaced by a sense of being and belonging through the bureaucratic institutions of the modern state.

It is our contention that many debates relating to the form and substance of current education practices are related to a misinterpretation or misrepresentation of the changed nature of contemporary social life. The current debate about the nature of tertiary education in the new struggle for national renovation is an example of the confusion and conflict engendered by the bureaucratized form of social life. Within the more restricted context of distance education it is essential that the radically altered nature of social life is made problematic and placed on the agenda of considerations for students of curriculum.

The 'Curriculum Theory' course, as described in this chapter, brings into question any static view of the relationship between education and society. By its practice it clearly brings into question more conventional assumptions about the relationship between the university and society. In its substance and its pedagogy it challenges the view that it is the task of the teachers of the course to present a 'correct' view of theory to be implemented by students of the course in their curriculum practice. Yet it must confront its own role and agency in the production of more bureaucratized and abstracted social relations.

Many of the articles which have been written in this *Journal* as well as the earlier editions highlight the impact of this transformation. It is relevant for all of us to read the different articles with a strong sense of the new logic which is at work. It is here that our separate contexts and problems can help inform us of the bigger picture which is being etched on the ground on which we all stand. This approach of critical exchange is also part of a practice which maintains a sense of the ideal of education as an aspect of the cultural heritage; and not just as an appendage of the instrumental demands of the new breed of political managers. That is where curriculum issues can be debated as an aspect of long term traditions and practices in particular settings and not simply according to the quantifying logic of performance indicators.

The changing ideas, practices and social relations of society in general can be read in the life of the 'Curriculum Theory' course, just as they can be read in other parts of social life, despite the aspirations of the course to challenge at least some of them. It would be at least uncharitable to assert that the course did nor (or does not) challenge some taken-for-granted assumptions about curriculum and pedagogy for example, by changing the role of the reacher, by establishing direct communication between students through the medium of the *Course Journal*, by taking some steps towards establishing a critical community in which students together make critical analyses of their own curriculum work and of contemporary curriculum theoretic ideas. But the very modes of relationship possible in the course are ones which bedevil contemporary social life, including the abstraction of ideas and interpersonal relationships. The need and demand for distance education is in a sense an expression of what some might see as a social pathology—the isolation of people from the sites and people in which and with whom they can become educated. We are less certain than we were when first we designed the course about whether distance education is an expression of the problem or part of its resolution. In the case of the 'Curriculum Theory' course there is a certain irony in creating a 'course community' in which members interact almost wholly through a journal, with very limited access to one another as persons, and in a highly deliberate, careful, written form. The appearance of the *Journal* only four times a year also gives the interaction an attenuated, stylized quality which mitigates against the kind of 'suck it and see' interchange which helps people develop confidence and competence in critical discourse.

It is not simply that the "Curriculum Theory' course is limited in achieving its aspirations by the attenuation of relationships characteristic of distance education. It is also that, by its very operation, it models these attenuated relationships and thus creates conditions for their reproduction. To the extent that it is successful it may even encourage participants to believe that distance relationships are as 'normal' and as 'real'—even as 'critical'—as face-to-face relationships can be. There is little doubt that such relationships are increasingly typical of the abstracted social relationships characteristic of contemporary society, but the course aims to treat such relationships critically rather than to take them for granted. If such relationships are part of the means by which societies are able not only to coordinate action across vast spaces but also to keep the operation of certain economic and cultural interests invisible and thus contain the expression of critical thought and the development of solidarity (for example, in social movements), then a profound question is raised for any course which attempts to create a 'critical community' through distance education. Can such a course be 'critical' in ways which challenge the presumptions of the very means by which it is offered? Can it be 'critical' in ways which reveal the ownership and control of the means of communication which make it possible? Does such a course reveal the attenuation of social relationships in technologized, bureaucratized societies, or does it simply exploit and symbolize them?

Of course, these questions do not apply to Deakin's Curriculum Theory' course alone. Nor do they apply only to courses with an explicitly 'critical' intent. The trends to abstraction are apparent in institutionalized education in general. What is apparent in innovation in distance education as a field (especially given its fascination for the potential of new information technologies like computer-based teaching and learning, the use of satellite communication, and the like) is the emergence of new patterns of social interaction based on the increasing acceptance of abstraction—abstraction not only in the realm of ideas, but also in our modes of social relationship (increasingly mediated by organizations and technologies of communication), and even our understanding of our own identities. This trend towards abstraction requires interpretation and it requires attempts to invoke alternative practices—interpretations and practices capable of relocating us as agents in the production of our own identities, our social relationships and our society.

Our argument is that the forms of social life which previously shaped education and schooling have changed markedly. Some argue that education should 'keep up with' the shifts in our forms of social life which the changing technology of communications has wrought by mimicking and extending the new communicative forms in schooling (for example, by increased use of computers as if this were necessarily a contribution to the development of the 'information society' as a better society for all people). Others are less sanguine about such developments, seeing in them the possibility that an extension or expansion of these technologies of communication in schooling may threaten the practice of education, undermining the very possibility of critical thought. The problem was well articulated by Stanley Aronowitz, writing about Max Horkheimer:

> In his book *The Eclipse of Reason*, Max HOrkheimer, founder of the Frankfurt Institute for Social Research, provide one of the most succinct formulations of the problem engendered by mass culture. According to Horkheimer, the significance of the challenge posed by the massified culture industry to civilisation as such consisted in its assault on the capacity to engage in critical thought as a meaningful form of social discourse. Horkheimer cared deeply about the content of critical thought, but with the rise of fascism he became more concerned with the spectre of the end of reason itself. In his view, the capacity of humans to distance themselves from the object in order to gain a perspective on their social world can no longer be taken for granted. The restricted language and thought codes produced by the reduction of all thought to its technical dimensions reach for into the culture, encompassing schools as well as communications, the public as well as the private spheres of discourse. It is no longer a question of whether ordinary discourse is able to deal with specific ideological and social content. As Jurgen Habermas expressed it, the new situation raises the question of the competence of people to effectively communicate ideational content. The issue is the capacity for theoretical or conceptual thought itself. When people lack such competence, social action that transcends the struggle for justice within the empirically given rules of social organization and discourse is impossible.

On this analysis it is inappropriate for distance educators to continue thinking about their curricula and pedagogies in terms of criteria associated with a form of education and social life that has been superseded. The challenge now appears to be to find alternative ways to think about the new social contradictions associated with the turn towards the abstract mode of ideational, social and economic exchange characteristic of contemporary social life – a trend of which distance education is manifestly a part. This requires a form of theorizing that views culture in a comprehensive sense – one that moves beyond the different kinds of interpretation noted in the 'Preface' to the course monograph in which ideas about social consensus played such an important theoretical role. At the current historical juncture there is a need to offer a theoretical alternative to narrow, consensulaist, bureaucratic and technicist approaches to thinking about education. In curriculum theory significant steps were taken in this direction by the development of reproduction theory as a means of understanding education in relation to society, at first in its 'correspondence' form and later in its 'contestation' and 'resistance' theory forms. In their turn certain of the key ideas and assumptions of reproduction theory which persist from the theoretical frameworks of earlier times need to be challenged. For example, ideas about the determination of the cultural superstructure by the economic base (which tended to survive in the correspondence theory of reproduction) must be replaced by more dialectrical understandings of the mutual determination of base and superstructure, and there is a need to move beyond outmoded ideas about the nature and significance of social class which fail to acknowledge that the social relations of advanced capitalism are very different from the class relations of nineteenth century capitalism.

Developing such new forms of interpretation and new practices is the permanent problem of social theorizing, including curriculum theorizing. In the Kemmis/Fitzclarence monograph we argued that 'the central problem of curriculum theory is to be understood as double problem of the relationship between theory and practice, on the one hand, and of the relationship between education and society, on the other'. Moreover, 'curriculum theories are social theories not only in the sense that they reflect the history of the societies in which they arose, but also in the sense that they entail ideas about social change and, in particular, about the role of education in the reproduction and transformation of society'. We hold the view that these are the abiding concerns of curriculum theory and curriculum theorizing. We are as aware as ever that our own theory and practice, and the reproductive and transformative relationships created by the 'Curriculum Theory' course, are as much objects for critical and self-critical scrutiny as are any other educational institutions and practices. We remain conscious that both our theories and our curricula are, and must be, both the products of their times and limited by the blindnesses and partialities of the historically bound people who develop them.

Yet the curriculum problem confronted in the early days of planning the 'Curriculum Theory' course remains fresh and compelling – the problem of making a curriculum for a course about curriculum. It is even more culturally pointed as in 1988 the course team considers the problem of remaking the course – a *distance education* course about curriculum for students whose lives are increasingly characterized by abstracted and 'distanced' social relationships. The analysis is far from complete; the task is unfinished. Despite changing to meet its changing analysis and changing circumstances, the course team – and the students of the course – still stand at the threshold of the possibility of making a course which is what the original course team intended it to be: an introduction to the problems of theory and practice in curriculum which reveals these problems through a self-disclosing pedagogy, and a view of the substance of the course as both a product of the history of the field and a model for future practice.

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University-Level Distance Education

If we examine university-level distance education in various countries of the world we can see that the special educational traditions and socio-economic conditions of these countries have led to individual models of distance education in each case. In spite of this, it is possible to identify two distinct, supra-national models of distance education if we disregard some particular developments and minor exceptions: a western and an eastern one. They differ with regard to their rank in national educational policy, the competent and responsible persons for it in the hierarchy of the university, the degree of their organizational integration into the university, and the methods of teaching and learning employed.

Rank in national educational policy

The rank of the two models in the national educational policy can be easily identified when we consider the reasons for establishing distance education. In western countries the universities originally intended to help certain fringe groups to take part in university studies. Here, they were very much in the tradition of private correspondence schools or colleges. They were aimed at the individual person who was prevented from attending university by adverse circumstances. The number of distant students was, therefore, usually relatively small. Hence, distance education was not an important issue with educational politicians. As a rule it was neglected in the same way as correspondence education.

In eastern European countries the situation was entirely different. Here, distance education was introduced and developed systematically by the respective ministries of higher education in order to increase the number of qualified specialists in many branches of the economic and political system. At the same time, the governments intended to provide for additional access to the professions for wider sections of the working people. Finally, the governments believed that distance education was a good example for reaffirming the ideological concept of the close connection of theory and practice. Such a high degree of political motivation and, above all, the enormous demand of highly qualified specialists meant that the number of distant students increased so dramatically in the fifties and sixties that they made up a considerable percentage of the students in the universities - that is, 20 to 50 per cent, and in some disciplines even more. Only recently have these high numbers of students been somewhat reduced. This does not, however, detract from the great political importance of distance education at universities in eastern European countries. Experts assure us that this form of university study has become a permanent part of higher education. Legally, it is entirely on a par with that of traditional university study.

Areas of responsibility

The different goals of distance education have also led to different areas of responsibility. In the western model the establishment of distance education rests usually with the departments of university extension or adult education. These departments decide the contents and procedures of their distance education themselves. The result can be highly differentiated programmes, as, for instance, at the University of Wisconsin and the University of Nebraska. On the other hand, one can also find meagre programmes with a small number of accidental and unrelated correspondence courses often administered by only one secretary.

The relative autonomy of these departments has a special negative effect, in that they do not coordinate their programmes with those of other universities. For instance, American universities have developed fifty-eight different courses for distance education under the title *Survey of the history of the USA*. Clearly, this goes against important principles of distance education, especially against those of rationalization and centralization.

The eastern European model of distance study, however, can usually rely on centralized planning and coordination by the respective ministries of higher education,which also adapt the distant study programmes to the requirements of the economic system. Sometimes central institutes have been established to prepare and distribute the necessary teaching and study material and to examine problems of teaching at a distance for the benefit of all universities.

Integration into the hierarchy of the university

The way in which distance education is integrated into the hierarchy of the university sheds some light on its relative institutional importance.

As has already been mentioned,in western countries distance education is usually organized by a section of the department of university extension or adult education. As these departments lack the academic reputation and the weight and power of the classical faculties or departments, this organizational structure is bound to be detrimental to the healthy development of distance education. The same can be said about universities which cooperate with correspondence colleges outside the university by using their course material as,for instance, the University of Lund. There,distance education is even less integrated. An extreme form of this non-integration of distance education can be found when the university limits itself to conducting final examinations only and relies on private correspondence colleges for the teaching of the courses. For a very long time the University of London was a good example of this approach.

In *Eastern* European countries the organizat-ional structure of distance education provides that most professors, deans and reactors of the universities have to be responsible for their distant students in the same way as for their day students. Quite often the universities even have special prorectors for distance study. In this way, distance education is fully integrated not only into the general teaching programme, but also into the hierarchy of the university.

A total integration is achieved in seventeen higher educational institutions in the USSR and in China. There, the entire faculty of the college caters exclusively for distant students. If we want to find out what a similar set-up would look like in a western county, we need only examine the University of South Africa, where there is a whole university which takes care of distant students only.

Methods of teaching and learning

There are also fundamental differences between the two models of distance education with regard to the methods of teaching and learning employed. A first structural difference can be derived from the fact that western correspondence schools have contributed considerable experience to the development of printed teaching material. It was taken over by universities and adapted to their special purposes. Over the last hundred years private correspondence colleges have accumulated special knowledge of how to teach at a distance, which could easily be systematized into a methodology of teaching by writing. However, the value of this methodology should not be assessed as being higher than that of traditional methodologies for face-to-face teaching based on common sense, pragmatic approaches and didactic recipes. Nevertheless, wherever western universities insist on a careful development of written special materials for distance study courses and on a regular correspondence between teacher and student, they profit by these early experiences.

Eastern European models of distance education, however, are not related to this tradition. Consequently, little or no attention is paid to the development of special teaching and learning material and to the regular, individual correction of test papers. Mostly, these elements are substituted by regular consultation periods at weekends, and b yearly seminars of several weeks' length. This may be considered as an adjustment of forms of traditional university study to the conditions of distant students. It was made under the unfortunate socio-economic conditions of the time after World War II. Hence, many measures were dictated by sheer need. The students were urged to work in full-time employment and to study at the university at the same time. The universities had to rely on the professors and the further teaching staff as well as on the infrastructure at hand. they used the same curricula and the same text-books which were provided for the say students. Hence, one could define the eastern model of distance education as a system of administrative measures which enable the universities to cater for considerable numbers of additional students who were expected to study mainly at home. This, of course, means that the eastern model is not derived from any elaborated concept in which the elements of self-study, regional consultation periods and yearly seminars at the university are carefully related to one another. Gerhard Dietze, a leading expert in distance education at the University of Dresden, deplores, for instance, the fact that 'the general scientific concept of distance education is inadequate and that, so far, its crucial components and their interactions in view of optimal learning conditions have not yet been analysed at all'. And Andrej Kamiac, a Czechioslovakian expert, explained that in his country distance education was introduced and developed by the administration of the universities and not by experts in teaching methodology.

Technological model of distance education

Reports from the United States, Sweden and Japan, and the planning papers of the Open University in Great Britain,show that at present a third model of distance education is becoming discernible. It is characterized by the calculated use of modern technical media—for instance, television, radio, computer and telephone, as well as audio and video tapes. This development changes the structure of the teaching and learning process to such a great extent that it seems to be justified to speak of new form of distance education, which I should like to call for the time being the 'technological model'.

The structural change can be seen immediately if one realizes that the use of these technical media confronts the teachers with new and difficult problems, as the contents of teaching and the teaching functions have to be redistributed if they change from the use of predominantly one medium—the correspondence course—to bi-or multimedia teaching activities. The new technical media force them to objectify longer sequences of their teaching. Careful, time-consuming and expensive preparations have now become inevitable. All the problems of planning the teaching-learning process, especially the division of labour between the teachers and media experts, and the organization and control of learning activities, assume a new importance.

Fortunately, the new model of distance study can profit from the 'technological turn' in the methodology of teaching which can at present be identified - mainly as a consequence of experiments with programmed learning. Today, it is easier to recognize the characteristic outlines of the emerging new model of distance education and to further its progressive elements than it would have been only a few years ago, because the newly developed 'educational technology' already provides us with a number of categories necessary for analysing and describing it.

Such assistance, though, cannot be expected from an educational technology which regards itself as the technical or instrumental side of the teaching-learning process only and attempts to reinforce it. Rather, we will have to look out for an educational technology which concentrates on the use of scientific methods and procedures for the planning, development and evaluation of teaching-learning projects. A. A. Lumsdaine, who described such an educational technology for the first time, said that it depends on the scientific disciplines related it in the same way as, for instance, the technology of engineering depends physics and the technology of medicine on biology. In short, the technological turn in the methodology of teaching and learning means that those process are to be explored and manipulated which can help to influence the learning situation.

Flechsing has pointed out that the technological turn in the methodology of teaching is brought about in five phases. In the first phase, the technical medium is used to stimulate the teacher, in the second phase this approach is given up and teaching techniques are developed in a rational way, which are optimized in the third phase. In the fourth phase, teaching techniques are coordinated with the help of systems approach, and in the last phase the development work is based on curriculum research and the duplication of teaching techniques.

It is important to investigate how the western and eastern models of distance education relate to these phases, and what the possible features of the coming technological model of distance education will be...

If we analyse the relationship of distance education to the five phases of the technological development we can conclude that it had a remarkable affinity to some of these phases long before this concept was developed. and, on the other hand, we can identify several features which do not yet correspond to these phases. In other words, distance education is partly a forerunner of educational technology and in part still lacks the specific technological development.

Such a partial delay need not concern or discourage distance education experts. It can already be considered to be remarkable progress that study can be improved as the technological model displays the standards of future developments in distance education. Only ten years ago the improvement of projects of distance education took lace more or less arbitrarily at best based on conjectures or according to the principle of trail and error. Even if money was available, one could not really identify the critical factors in the system of distance education which needed purposeful changes. The real contribution of the new educational technology is that now things have changed. It provides us with a system of scientific instruments and procedures which enable us to improve distance education systematically and also verify the outcomes. Even more: if we match a given project of distance education with the five phases of the technological turn its structural advantages and deficits become clearly visible. This is very favourable precondition for slowly raising the development of distance education to higher levels of accomplishment.

An additional advantage of the new technological model of distance education is that the techniques of planning, designing and optimizing projects in distance education can be favourable for the further development of distance study at university level.

Which of the three models of distance education will become dominant? We believe that the western and eastern models will continue for a considerable time as they have already become a matter of routine and have also become a tradition. The technological model is much more demanding, as special experts, very expensive media and organizational systems will be required. For this reason, only a slow development can be predicted. In the long run, however, this model will permeate all endeavours of the teaching at a distance at university level.

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Distance Teaching

It is sometimes said that there is nothing new about the concept of distance education, since it is possible to point to examples of the use of written material for educational purposes almost back to the beginning of written records and a clearly didactic objective is inherent in, for example, the Epistles of St. Paul. However, it is only in the twentieth century, and perhaps particularly in the last decade, that teaching at a distance has achieved international recognition and even acclaim. Consequently some have seen teaching at a distance as an industrialized form of teaching arising out of the new techniques which have been perfected in the twentieth century; others, while not denying the importance of the new technologies, have seen in the recent rapid growth of this form of reaching a reflection of the increased and increasing costs of conventional teaching which is very labour intensive and to which distance teaching offers, therefore, a seductive alternative.

What makes distance teaching popular?

In both developing and developed countries the possibility of supplementing or even perhaps replacing conventional teaching methods by teaching at a distance has had wide appeal. For the developing countries, where the supply of trained and competent teachers is often severely restricted, teaching at a distance materials can be produced by a small skilled group of teacher which set a standard of excellence capable of wide dissemination, by passing the need for training, in the first instance, a generation of teachers and thus significantly reducing the time scale for mass education. An example of this can be seen in India where the central government, with technical assistance from UNESCO, has been involved in planning an open school project at the secondary level based on the Central Board of Secondary Education and following a similar syllabus to the Central Board's conventional secondary schools. Such a system would not only cater for 'drop-outs' from the conventional system—a large and increasing number forced for economic reasons to abandon full-time education and seek employment— but also 'left-outs', since the conventional secondary education system is not equipped to cater for the increasing size of the school population. In the developed countries the motives for experiments in teaching at a distance are more complex and here, perhaps, the cost of employing teachers is a more significant factor, but it is worth noting that one of the three primary objectives of the state government of Nordrhein-westfalen in setting up the Fernuniversitat in Hagen was to deal with the fact that the conventional universities could not cope with qualified potential students. However, even in developed countries the lateral expansion of knowledge—the arrival of new subjects and new disciplines—can and often has outstripped the supply of teachers and we can see, for example, in the United Kingdoms that the government is now beginning to use the expertise of the open University in the area of continuing education and for updating in subjects such as computer science and the use of computing in management where the advances have been so rapid as to deny the opportunity for training a large cohort of teachers.

Freedom and restrictions on distance students

Teaching at a distance liberates the student/teacher interface from the strait - jacket of the lecture hall or tutorial room. The student may learn when he wants, whatever the hour of the day or night; he may learn wherever he wants; he may learn at his own pace. Because of this 'freedom' allowed to the student learning at a distance, we might consider that teaching at a distance is inherently a more individualized system than the conventional face-to-face method as far as the student is concerned. In the conventional system, teaching is directed to a group and the group must learn together within the restrictions placed upon it by the abilities of those who form its membership. Its learning will therefore approximate to the mean between the extremes of the abilities of its members, and the needs and potential of the individual in learning will tend to be subservient to this mean. However, the student learning at a distance normally does so as an individual. He learns, therefore, in the way and at the pace which is most suitable to him since he controls his own learning situation. On the debit side, however, it is clear that the student learning alone and at a distance lacks the supportive atmosphere of the tutorial class. He has no-one against whom he can measure himself in the development of his learning. He does not know if he is doing well in relation to his learning. Indeed he has no framework against which to judge 'doing well'. He can of course expect to receive comments on and perhaps grading for, this work from his tutor, but this interaction is strictly between teacher and student, and the student is therefore always at a disadvantage. No comparison with the peer group is possible and the student learning at a distance lacks the usual bench marks for his self-assessment.

A variety of educational packages

Any system of teaching at a distance must concern itself with what it is teaching and how it is teaching. The variety of systems of teaching at a distance and the level of study which they embrace are now almost legion. Most of the systems contain a package of attractively presented self-instructional materials. Printed material invariably forms the basis of this package, but it is often supplemented by audio-visual material, normally on cassettes but sometimes offered through open circuit broadcasting. n all cases a great deal of though t is customarily put into the assembly of this package and it is made as attractive as possible for the student learning at a distance. The production of such packages is usually seen as the basis on which economic calculations are made and, since the production demands complex resources, both material and human, and requires long-term planning, it often dominates the system of teaching at a distance to the exclusion of all other activities. Indeed there is a beguiling temptation to assume that the problems of teaching at a distance can all be solved by the production of an as yet merely hypothetical perfect package of material.

This excessive concentration on the package is the institution-based approach to teaching at a distance and indeed it is characterized in the very use of the word 'teaching'. The student-based approach involves a more rigorous examination learning at a distance. It is, of course, inherently more difficult since, whereas the teaching approach can start from a fixed standard package—a unified, concrete and controllable phenomenon—and tacitly assume the subordination of the needs of the individual to that package, the student approach requires a consideration of the needs of the individual in relation to the package and must involve an examination of an almost infinitely variable base which cannot be controlled or completely variable base which cannot be controlled or completely stabilized within a specially delimited area.

A student-based versus institution-based approach

Yet why is it necessary to consider the student-based approach? Can we not seek to arrive more closely at the theoretically perfect teaching package of material? Before we can begin to arrive at any answer to this question, we institution to the student and the flow of contacts or interchange between both parties, the one attempting to teach and the other to learn at a distance. In a simple civilization there can be a personal relationship between the individual and those who stand for the religious or secular authority. In a complex civilization, such as our own, this personal relationship, of necessity, disappears. There is a gulf between the systems and the individual. Within this gulf in the complex civilization there has grown up a group of intermediaries—social workers, broadcasters, teachers, counsellors, etc. - who seek to adapt a system to the individual needs of people. The primary concern of the intermediaries is not for the system itself, but rather for the individuals and, although they are normally employees of the system, they seek to represent individual needs to such as extent that they force the system to take cognisance of these needs. In education this function of intermediary is embraced within a variety of roles which we refer to as teacher, tutor, advisor, counsellor, etc. The intermediary is concerned with the general welfare and support of students, but the various applications of this concern, both in breadth and depth, are almost infinite. On the one hand he may provide information on basic administrative functions; on the other hand he may offer psychological and medical advice. The reason for the variety of roles and duties lies in the variety of education itself. For each system of education we may posit a distinct supportive role.

Why are intermediaries necessary?

In examining a system of teaching at a distance we must analyse the requirements of an intermediary function. To pose the question in more concrete terms we must ask ourselves whether these requirements can be met by a package of materials, that is whether the package can take the place of every essential facet of the teacher in the conventional teaching situation.

Even a cursory examination of the learning process will lead to the conclusion that the needs of the student are not wholly related to the subject that is being studied. That is not to say that such needs are solely of a psychological nature and completely unconnected with the content of his study. His needs are of an educational kind, even of an academic kind, but they are not strictly related to a subject. This phenomenon is observable in education at all levels. The word 'teaching' is a simple definition of a complex interactive process and we might begin by dividing teaching from the point of view of the institution into the subject matter and advice/support. The subject matter would embrace the strictly academic content of the course and advice/support would embrace general study problems arising from the individual circumstances of the student or the system of teaching peculiar to the institution? We might look at this in another way by saying that the subject matter is information or knowledge and the advice/support covers the way in which the student as an individual fits this new knowledge into his own peculiar pre-existing framework and into his everyday life style.

Limitations of the package

What part does the teaching package in a system of teaching at a distance play in the intermediary role? Does it or could it provide both subject matter and advice/support for individuals? While not wishing to exclude the theoretical possibility that the teaching package could perform all these functions, there are a number of reasons for suggesting that in practice it will always fall a good way short of this ideal, if only for reasons of complexity and cost. While it is possible to define and de-limit the subject matter through an institutionally centred analysis in a way which might receive general assent within the institution, advice/support, being student-centred, is by comparison almost infinitely variable. It follows therefore that nay package of materials which seems to embrace advice/support must admit of almost infinite variation. Moreover, if we were to posit the existence of such a hypothetical package of materials, the cost of production and delivery would render it completely impractical. Clearly however, a package of material need not be limited to the subject matter. It may cover some aspects of advice/support which are judged to be universal or at least common. While economic considerations will of course be of importance in that area of the package which deals with the subject matter, it is likely in practice that general agreement can be obtained on the various limits of the subject matter and therefore on its cost. The same is unlikely to be true in the case of advice/ support and here the cost-benefit approach will begin to operate. All students need the subject matter, therefore this element is 'cost-effective'. Not all students can easily be seen to need some/all of what can be offered in terms of advice/ support; consequently it is by comparison far less cost-effective.

It does not seem unfair to suggest that there is an overwhelming tendency within the field of teaching at a distance to offer systems from the standpoint of the institution teaching at a distance, rather than from the standpoint of the student learning at a distance. The response to the individual needs of the student learning alone and at a distance has often become lost in the overriding requirement to produce a grand lose package of materials.

Contexts of distance and conventional students

Perhaps this failure to recognize and concentrate on individual needs arises out of a failure adequately to appreciate the difference between the conventional student and the student learning at a distance. Conventional students, in digesting the academic pabulum of their chosen study, exist within a highly artificial and wholly supportive framework. For most of them their study is merely a further stage in an unbroken linear development which began when they were infants. The infant school class and the university lecture are generically similar in offering a group learning situation with a face-to-face teacher/student contact and the subsequent possibility for instant feedback of an oral and visual nature. The group learning situation is itself supportive of the learning process, not only because of the potential interaction between students in relation o the academic content of the course - learning through discussion with one's peers - but also because the group learning offers a bench mark to the individual members of the group. The students might naturally expect to fall short of the comprehension of a particular subject which is demonstrated by their teacher. The benchmark of how short or 'how much of this are we expected to understand?' is provided by the group, and through the group a common denominator of success or achievement is established for all its members.

The situation of students learning at a distance is wholly different. Often they are returning to study after a number of years. For such people the concept and practice of their previous learning i somewhat clouded. They have an experience of life and work and hence a framework into which their new learning has to be set. Often the students learning at a distance are part-timers. Their work and families are of prime importance. It is not open to them as it is open to the conventional students to devote themselves entirely and with singular purpose to learning. Moreover, the process of learning at a distance is generically different from the face-to-face learning model is almost entirely absent. The supportive environment of the per group is lacking and the bench mark of achievement and, deriving from this, the maintenance of the individual's confidence, is difficult to establish.

A division of roles

It is elements of this sort, fundamental to the student learning at a distance, which the package of materials either cannot influence at all or can only influence in a marginal way. The teaching package is the raw academic pabulum of the institution for teaching at a distance; for the student learning at a distance there is need of another element, an advisor/supportive role. In conventional education the teacher can and often does preform the advisory/supportive role while acting as the source of academic knowledge. In a system of teaching at a distance we normally find the separation of the source of academic knowledge and the advisory/support role, the former being contained in the teaching package. The separation of these activities does not, in itself, create problems. Problems will however arise if the two elements are not balanced; if the teaching package predominates to the virtual or complete exclusion of the intermediary role; if the existence of these two activities is not constantly in the minds of those involved in teaching at a distance.

No-one who has given even a cursory glance to the literature of distance teaching will have failed to note a preoccupation, almost at times approaching hysteria, with the phenomenon variously described as drop-out, wastage, withdrawal, attrition, etc. This phenomenon exists in all forms of teaching, but in distance teaching it is a major characteristic since its incidence in often many times as great as in any form of conventional teaching, and its very existence threatens the 'cost-effectiveness' which is so often listed as an advantage. The hypothesis that the face-to-face teacher and the student's peer group could not be adequately replaced in distance teaching received, until recently, almost universal credence and this belief was 'substantiated' by reference to drop-out statistics. In the last decade and particularly in the last two or three years the hypothesis has received a practical challenge from the success of the Open University in the United Kingdoms. Here, instead of the ninety per cent drop-out confidently predicted in the educational press when the University first began to offer courses, we find that up to sixty per cent of finally registered students are graduating, and, moreover, that a very significant proportion of the forty per cent of 'drop-outs' is in any case unavoidable, ranging from the obvious cases of death, through movement outside the United Kingdom, significant changes in domestic circumstances and satisfaction with the completion of a part rather than the whole of a particular programme. The success of the Open University has brought it an international reputation and many attempts have been made to transplant this success to other countries and other continents. So far it would appear that none have managed to improve upon the drop-out rate and thus, in popular terms, the 'success'. Indeed the opposite seems to be the truth. None have come anywhere near reaching a success rate approaching sixty per cent. There are a number of reasons for this but, we would suggest, only one of major significance. This popular conception of the Open University, even by those who have made a careful study of it, is of a system dominated by a highly structured package of correspondence texts and broadcasts.

The method of preparation of this package by a course team has been seen as a unique development and a major contributory factor to the quality of the package. The package - particularly the course units - and its method of production, are extensively and variously copied. Yet, we would contend that this analysis of the Open University does not rest wholly or entirely on the highly structure teaching package. It rests rather on the inter-relationships of that package with the student as an individual through the agency of the counselling and tuition functions peculiar to the Open University. It is the combination of these elements on which the comparative success of the Open University is based. Neither is sufficient in itself.

Contracting the Open University with Fernuniversitat

The truth of this hypothesis might be supported in quasi-mathematical terms through the use of a paradigm of the Open University. The Fernuniversitat in Hagen falls within the same broad ambit of Western European culture and tradition as the Open University in the United Kingdom. While the countries are not identical in geographical, cultural and economic terms they are, nevertheless, very similar. The students of the Fernuniversitat are highly motivated, being self-selecting as in the Open University. In general, however, they are far better qualified than Open University students, since they must normally have achieved the Abitur, whereas forty per cent Open University students in the last three years have less than the minimal requirements for normal entry to a degree course at universities and polytechnics in the United Kingdom.

The teaching package of the Fernuniversitat does not contain open circuit broadcasting, although audio and video material is often available in cassette form.

Bases of Open University support services

If we accept that, for all practical purposes, the advice/support function cannot be supplied through the teaching package, but see it as a vital element in the system, we can go on to consider the ways in which this might be supplied.

In practice, Open University support services are offered through tutor-counsellors in some two hundred and sixty local study centers throughout the United Kingdom. In addition, students are attached to specialist tutors to deal with the specific academic content of the course and to mark their assignments. The function of the tutors is exclusively related to the teaching package. What then is the rationale behind the us of study centres and tutor-counsellors?

The use of study centres in a system of teaching at a distance might not unreasonably been seen s a contradiction in terms. Study at a distance is normally depicted as independent of time and place and these are normally claimed as characteristics and advantages for the system. But study centres impose a restriction in place; they also impose a restriction in time to a greater or lesser extent as they are not open all day for every day of the year. Are study centres per se an essential part of teaching at a distance, if it is to be successful, or are they not essential at all? If the latter is true, why do many systems of teaching at a distance use them and in particular the Open University? Since they almost invariably offer a facility for face-to-face interaction, do they therefore deny on this account the practical viability of teaching at a distance?

Radio, television and telephone supplementing print

In our earlier analysis we defined the teaching process as the transmission of subject matter and advice/support. Until the sixteenth century, the transmission of subject matter or at any rate its wide dissemination—was through a verbal medium. Cost and time factors inherent in copying by hand placed out of court the provision of a text for students. The professors and the lecturers communicated verbally with their students as the very root of these words implies. The introduction of print brought a dramatic change. The professors and lecturers continued to lecture to their students, but no longer was the student limited exclusively to the time and space of a lecture room. He could have as a supplement - or even as a substitute - a text book written by someone to whom he would, perhaps not otherwise have access. Moreover, he could study this in his own time an at his own pace, re-reading whenever and wherever he thought fit. However, the text book had none of the interaction of face-to-face teaching. Teaching at a distance relies now, and for the foreseeable future will continue to rely, upon the technology of printing. Other more recent technologies have supplemented this, but none have replace it. The telephone has offered a direct substitute for student/tutor interaction. The student can receive an immediate response to his question through the telephone as in the lecture room. He lacks the non-verbal signs of normal communication, but this is not usually seen as a vital loss. However, the telephone is limited in time, since tutors and students must have their interchange at the same time and it is limited in space both by the requirement of an installation and by the cost of the link. Furthermore, telephone lectures or tutorials between one tutor and a number of students, while fearless costly in tutor time, being to pose some of the disadvantages of radio in that tutors, deprived of on-verbal signals, teach at their own pace, and their students, unwilling to contribute to a technological anarchy, refrain from interrupting. There are certain similar disadvantages attached to the use of radio. While open circuit broadcasting is restrictive in time and space, the use of audio and video cassettes can ameliorate, to some extent, these problems by offering the student an opportunity to view and listen at his own pace and in his own time, the availability of a re-play facility being the only restriction. However, the possibility of interaction between tutor and student is the virtually non-existent within this medium. Printed material, radio and television can be used for the simple transmission of subject matter. Assuming re-play facilities, all can be used by the student in his own time and, with the wide dissemination of equipment in recent years, all are, or could be, independent of space. They are however the tools of *teaching* at a distance, not necessarily of *learning* at a distance, since they are not susceptible of an interactive mode: only the telephone offers this facility.

Education is about learning more than teaching

The view that education is primarily a learning process on the part of the student rather than a instrumental process on the part of the teacher has achieved almost universal acceptance in recent years. The fact that the Ministry of Education in Italy is till called the Department of Public Instruction and that *enseignement* is still used in France can be seen as anachronisms. In Germany the use of *Fern unterricht* for 'distance teaching' has been superseded at all levels by the term *Fernstudium* (distance learning) which had originally only been used for degree level study. While recognizing this trend in educational thinking, distance teaching systems have found difficulty in its practical application. One solution has been to develop, for the printed medium highly structured self-instructional materials in which the student is required to respond at regular intervals to the text and there follows a discussion of a variety of potential responses. Because of the wide range of possible responses, the discussion cannot be all embracing, so that this development must always fall some way short of perfection. However, the creation of this internal dialogue for the student within the material has been a significant element in changing the student from a passive to an active learner.

The standard teaching package, however well structured, cannot provide an individualized learning system for students. It is only the introduction of a human element which can adapt to the almost infinite variety of student needs. Hence, in distance teaching, and in particular in the Open University, we have witnessed in recent years the refinement of teaching by correspondence alongside the development of the carefully designed teaching package. The technique and the approach of the correspondence tutor are not always immediately grasped by those who have been engaged in the traditional forms of teaching. The correspondence tutor is that of a facilitator. This requires two things:

the ability on the part of the correspondence tutor to convey through his comments advice for further study and the ability to perceive his student's present state of knowledge and conceptual framework, so that the advice may be as relevant as possible to the individual student. The tutor must offer comments which are considered, human, constructive and supportive. The formal nature of written comment which is not susceptible of the inflection, tone and pause of speech, renders it liable to misinterpretation. Clarity is essential. While much has been done to refine the art of correspondence teaching, it is, as yet in its infancy. It is clearly not the case that the skills of the traditional teacher can be adapted for correspondence teaching; rather three is a need for the development of new skills.

The Open University has combined its teaching package with an individual support system offered through correspondence tuition and a general and continuous academic support provided by a a tutor-counsellor, who is responsible for the progress of the individual student from entry into the University until graduation. This general service is supplemented by specialist tuition beyond the foundation level. The interrelationship of the package of materials with the student has been achieved through the agency of tutor-counsellors and course tutors. Individual contact can be, and often is made by telephone and by post.

A rationale for study centres?

But we have till not supplied a rationale for the study centre, and indeed we seem increasingly to be isolating it as superfluous and as an anachronism in a system which, as we have seen, can probably comprehend the subject matter and advice/support. The study centre has been used for a number of functions in various distance teaching systems. In some it has been seen as a viewing centre where replay devices may be used. In others it has been seen as a library resource centre. In some it has been seen as a locus for student interaction and self-help groups, a substitute for the conventional campus. In yet others it has offered a site for practical experiments or the use of equipment, such as computing facilities, which are essential to study, but which cannot be offered to the student at home without great difficulty. Finally, there are cases where the origin of the study centre system is shrouded in complex educational politics, and study centres are seen as a tangible link between the otherwise amorphous distance teaching institution and the local community.

Can we then say that the study centre is the dustbin of teaching at a distance? Is it the repository into which are emptied those functions or parts of functions which seem to be too difficult or too expensive to carry out? Is it there because we cannot feel completely confident as yet in our combination of teaching materials and correspondence tuition, because it is particularly useful in the provision of the advice/support function in which the necessity for individualization is paramount? Is the presence of study centres a denial of the practical possibility, as yet, of teaching at a distance? Might we so 'improve' teaching at a distance as to be able to dispense with study centres entirely?

We might construct cogent arguments against the use of study centres. Clearly they are a costly element. As far as can be ascertained in all systems of teaching at a distance, students falls a long way short of the use and need projected by the institution. It is clear that a large number of students either are not able, or choose not to, attend a study centre. Clearly, many students choose to study by distance teaching methods because they prefer or require, for domestic or work purpose, to be freed from the time an space constraints of conventional teaching methods.

Continuingly changing functions

We would suggest that we are being over-simplistic, if we take the view that the study centre in the Open University s merely a dustbin wherein we can deposit all the difficult functions of teaching at a distance, which we intend ultimately to carry out by other means. Indeed, we would suggest that it is entirely wrong to see study centres in the Open University solely against the background of traditional education, as placed in which conventional face-to-face contact between teachers and students takes place. Within the Open University our concept of a study centre is blinkered by our adherence to the objectives of study centres seen in the original report of the Planning Committee of the Open University. The Planning Committee had initially seen two purposes for study centres. They were to be used as viewing centres and as places in which tutorials would take place. Such tutorials were envisaged as an essential element in this system of teaching at a distance. The reality, almost from the beginning, proved to be different. Over two hundred and sixty study centres were created, but within the first three years it became apparent that they were not being and could not be used as originally intended. The open circuit broadcasting of radio and television did not always match the evening opening times for study centres. Furthermore, the store of audio and video tapes, particularly the latter, became too expensive to maintain, and the replay facility provided through technicolour machines and audio-cassette devices lapsed. The increase in the number of courses after foundation level was not and could not be matched by increases the student numbers. The average post-foundation course population rapidly fell below two students per study centre. The idea of local tutorials, other than of the high population foundation level courses thus disappeared. Thus the conception of study centres as viewing centres and locations for essential tuition was not even the case, in practice, in the University's first year of operation. It is even less the case today. Yet the Open University has failed to re-define the role of study centres in its formal publications, although a significant element of their role is implicit in the functions of the tutor-counsellors.

A focus for the tutor-counsellor

Tutor-counsellors are seen in the Open University as the local and continuing support for students. The description of this support as local is given a physical presence in the study centre which is seen as the base for a tutor-counsellor's activities. The local study centre is a place in which the foundation level tutor-counsellor is able to offer face-to-face support of a strictly academic and of an advisory/supportive nature to his first year students, all of whom live in the vicinity. The tutor-cousellor is seen as weaning students from the traditional methods of face-to-face group teaching to the Open University's methods of individual and independent study. The study centre is, in reality, a traditional phase for the students in this process. For the student it has much of the appearance of the traditional classroom is that it is a physical location in which an authoritative fugue, the tutor-counsellor, is present. If the similarity between the traditional and non-traditional teaching methods holds good for the physical situation, it certainly does not hold good for the educational rationale. The tutor-counsellor does not lecture or profess a subject in the traditional way. Instead he takes the academic content as given in the shape of the course units and broadcasts and sets out instead he takes the academic content as given in the shape of the course units and broadcasts and sets out instead to help the student to learn from the material, either by himself or in groups. As such, therefore, we might describe the study centre as an important element for most new students in the painful early steps of adapting to learning at a distance. It is a stepping stone from group learning of the traditional sort to individual and/or group learning of the non-traditional sort. While it is possible that some students do not need such a stepping stone, it seems clear from the attendance of students themselves that most students still require this element. Moreover, the needs of the individual can be met by the service of the tutor-counsellor in the study centre. The student may take advantage of what is offered whenever and as often as he pleases. He may feel no need to attend for some time but later develop a need. Such a need is met by the regular presence of the tutor-counsellor in the study centre.

A local resource centre

It might be alleged that this argument does not hold equally true for post-foundation level tuition and this is almost certainly true. For post-foundation level students the tuition is unlikely to be as 'local', but the study centre with its face-to-face tutorials - and by this we mean tutorials in the Open University sense—does satisfy a need. The face-to-face contact provides for a large of students a stimulus, both social and educational, to the continuing process of study. The initial strong 'local' support of the tutor-counsellor is not totally withdrawn after the first year. It exits in more rarefied form thereafter but can be tapped into by the student as an when he thinks fit.

The study centre is a place in which tutorials, day schools and self-help goods take place. Students do not us these facilities as often as the institution makes them available, but they are nevertheless essential. We know that students do not read every word of the course units or even all the course units. They sometimes—perhaps often—do not read the set books. Some students omit the radio and television broadcasts entirely, most are extremely selective. Some students do not complete all their home experiment kit activities and, indeed, a few do not even open up the boxes. It is certainly over-simplistic to try to use student usage as the sole determinant of the value of an element in the system, unless of course the use is that of a careful. It is the richness and variety, the multiplicity of provision, which attracts and sustains our students. Study centres and what is offered in them are part of this richness of provision.

Are study centres an anomaly?

Are we to say that study centres are a contradiction of the feasibility of teaching at a distance? The answer for the Open University is certainly no. The confusion rests with the definition of teaching at a distance. If we consider the variety of teaching and learning processes we might see at one extreme the continuous face-to-face dialogue between one teacher and one student, a totally supportive learning situation. Further along the spectrum we find the conventional primary school in which the authoritative figure of the teacher provides a continuous contact throughout the day with a group of students. Much further along the spectrum we find a traditional university teaching system in which the authoritative figure of the teacher appears only occasionally and the students are more independent in their learning situation. At the other rend of the spectrum we find a pure system of teaching at a distance in which the student is learning at a distance from those who have prepared the material and learns at his own pace, wherever he wishes to study. The Open University, like the conventional universities, falls somewhere between the two ends of the spectrum, although it is clearly further towards the end of pure distance teaching. Its position in the system has been determined by a number of elements. These include the varying entry qualifications of its students, their domestic and work circumstances as adults learning part-time, their previous experience of learning and their perception of what they are capable of and the support that they require. The study centres and what is provided in them are part of the total package of the Open University teaching system to which we ascribe overall the generic term of teaching at a distance. There is no contradiction between the notion of study centres and teaching at a distance.

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An Interpretation of Distance Education

The more one attempts to grasp and explain the phenomenon of distance teaching, and especially the more one tries to identify the particular educational opportunities distinguishing this form of teaching from other forms of imparting academic knowledge, the clearer it becomes that the conventional range of educational terminology is not sufficiently comprehensive. Distance study represents facts new to education in several aspects. Compared with other forms of study it was novel in the form in which it made its first breakthrough over ninty years ago. With even greater justification it can be called novel in its present form in which it is currently spreading throughout the world, contributing towards the discovery of the educational opportunities provided by the modern media, such as radio and television. It is, above all, novel and pointing towards the future when it makes use of electronic data-processing equipment and wide-band cable transmission techniques. It is no coincidence that university study at a distance, in its early form of correspondence teaching, began its development only about 130 years ago, as it requires conditions that only existed from then on. One necessity, for example, is a relatively fast and regular postal and transport service. The first railway lines and the first correspondence schools were established around the same time. When one further realizes how much technical support distance teaching establishment need nowadays in order to cater effectively for large groups of students, it becomes clear that distance study is a form of study complementary to our industrial and technological age. Lectures, seminars and practice sessions, on the other hand, have developed from forms of teaching derived from ancient rhetoric and were practised at medieval universities; the colloquium originates from the dialogic teaching methods of the humanistic era. These forms of teaching have changed little in their basic structure since the beginning of the nineteenth century. They proved almost completely resistant to combination with technical support facilities. In this context they can therefore be described as pre-industrial forms of study.

On account of these differences, distance study can only be described and analysed to a limited extent using traditional educational terms. They are not wholly adequate for this new form of study. This is understandable in so far as these terms developed from pre-industrial forms of teaching. If one applies them to distance study one will think in conventional concepts. To emphasize the point, one looks at a new form of study from an old perspective and has one's view of the essential structural characteristics distorted.

Industrialization is the symbol of a new epoch in the development of man fundamentally different from all previous epochs. It is without example in history, above all, on account of the basic changes in most spheres of human existence. Academic teaching alone seems to have remained largely unscathed by industrialization—with the exception of distance study, for this form of study is remarkably consistent with the principles and tendencies of industrialization. For this reason, experimentally, structural elements, concepts and principles derived from the theories of industrial production are used here to interpret the distance study phenomenon. This does not mean that the teaching and learning processes occurring in distance study are equated with processes in industrial production. The comparison is purely heuristic.

A comparison of this kind between a form of teaching and processes from another sphere of life is legitimate and not without example in the history of educational theory. Amos Comenius, the 'founder and virtuoso of the method of parallel comparison' in his *Didactical Magna*, for example, compared the 'art of teaching' in unusual detail with the art of printing, also a technical process. Theodor Litt identified the nature of pedagogic thinking by comparing it with artistic creativity, technology and the processes of growth. In the sixties, experiments were carried out which tried to explain the teaching and learning processes using the technical model of the feedback control system, in order to find approaches to a 'cybernetic pedagogy' . Most impressive, however, was the achievement of Gottfried Hausmann who, in 1959, condensed the analogy between the dramatic arts and education into a 'dramaturgy of teaching'. In it he interprets the educational structure of teaching and learning processes in detail using the terms and principles of the dramatic are in the theatre. Paul Heimann saw the merit of this comprehensive and detailed comparison in the possibility that 'it might give rise to a complete revision of our teaching and learning models'.

Furthermore, it may not be without significance for this planned interpretation that for another important aspect of university or college work, namely research, comparisons with the production process already exist. In 1919, Max Weber defined structural similarities between research institutes and capitalistic organizations and, in 1924, Helmut Plessner pointed out that the 'mechanization, methodization and depersonalization of the manufacturing process equally dominate the production of economic as well as cultural goods'. The following comparison between distance study and the industrial production process will prove similar consistencies.

From the start, distance study has a special relationship with the industrial production process in so far as the production of study materials in itself is an industrial process built into the whole teaching process as a constituent part, quite unlike the production of textbooks, for example. In the case of commercial distance teaching establishments the further question of selling the printed or otherwise duplicated study units adds calculations of applied economics to the teaching process. Even the distance teaching departments of government-financed universities are not entirely free from these considerations. It would be interesting to examine how far these facts have already influenced the structure of distance teaching.

In order to facilitate the discovery of further relationships between distance teaching and the production process, the following structural changes - essentially brought about by industrialization - in the development of the production of goods should be noted:

1 According to the principle of rationalization, individual work as was traditional in the craftsmen's trades changes at an early stage to a production based on the division of labour, and this later leads to the development of assembly lines and mass production.

2 Work processes initially characterized by the use of tools are increasingly restructured by mechanization and, later, automation.

3 In detail, these changes lead to the following results:
   - The preparatory phase becomes increasingly important;
   - Success depends, among other things, on systematic planning and organization. Scientific measures of control are needed;
   - Work processes must be formalized and products standardized. The production process is objectified;
   - Each developmental step towards increased mechanization leads to changes in the function of those involved in the production process;
   - Small concerns are no longer able to raise the investment needed for developmental work and technical

equipment. A strong tendency towards concentration and centralization becomes noticeable.

The terms used in business studies to describe these facts will be outlined briefly and - where possible - applied to distance teaching.

Rationalization

By rationalization we mean all 'methodical' 'measures' with the purpose of achieving 'output with a comparatively lower input of power, time and money'. Scientific discoveries should 'be evaluated for practical use in such a way as to achieve the best possible results in view of the continually necessary development and redevelopment of economic and technical processes'.

Applied to the practical example of the production process this means that 'the entire production line, from raw material to end product, is carefully analysed to allow each single work process to be planned so as to make the most effective contribution possible towards achieving clearly formulated business tasks.

Georges Friedmann emphasizes that this is a dynamic process aiming at continuous improvement in quality through continuous progress in the study of materials, accuracy and precision'. Rationalisation of this type has only started to develop with increasing industrialization at the end of the nineteenth century.

Management science holds that the reason for the considerable obstacles to rationalization lies in human nature itself, because 'human inadequacy inhibits the motivation to gain unprejudiced views and the willingness to act according to rational convictions'. Further obstacles are considered to be tradition, convention, habits and fashion. In education, a rationalizing way of thinking is nothing new. In a general form, it influences the reasoning for numerous educational decisions. For example, the introduction of lectures to larger groups of students, the use of printed books and the specialization of university lecturers were considerable steps towards the rationalization of the academic teaching process. Every university teacher will, when planning a lecture, choose those subjects that will best help him or her to fulfil the purpose of that particular lecture. In distance teaching, however, ways of thinking, attitudes and procedures can be found which only established themselves in the wake of an increased rationalization in the industrialization of production processes. The characteristic details are, among others, as follows:

1 In distance study the teaching process is based on the division of labour and detached from the person of the university lecturer. It is therefore independent from a subjectively determined teaching situation, thus eliminating part of the earlier mentioned obstacles to rationalization. The division of labour and the objectification of the teaching process allow each work process to be planned in such a way that clearly formulated teaching objectives are achieved in the most effective manner. Specialists may be responsible for a limited area in each phase;

2 The use of technical equipment (duplicating machines, organization systems, transporting devices) makes it possible to convey the knowledge, ability and teaching skills of a university lecturer, by means of the detached objectivity of a distance study course of constant quality, to a theoretically unlimited number of students. The rationalization effect of mass production becomes apparent here;

3 The rigorous application of organizational principles and means saves teachers as well as students unnecessary effort;

4 At some of the newer distance teaching establishments, modern means of technical support, such as film, television and electronic data-processing installations, have replaced teaching staff in certain areas of their work,

in particular, in the fields of giving information and assessing performance;

5 Student work through a course which has been tested prior to going to print. This prevents misunderstandings and stops students from going in the wrong direction;

6 The quality of a distance study course can be improved, because its effectiveness can be monitored at any time by scientific methods.

If the number of students required in a society outgrows the number of university teachers available, rational thinking should be able to find ways and means of changing teaching methods in such a way that the teaching resources of the university teachers available are used to the best effect, quantitatively as well as qualitatively. Distances study can be regarded as a result of such endeavours.

The division of labour

The division of labour has played an important role in the sociological theories of the last 100 years. Applied to the production processes it means that the work is split in the sense of 'dividing one complete work process into a number of elementary procedures', as described by Adam Smith at an early stage. With an extensive division of labour 'training periods become shorter, more people are able to carry out the work and wages can be lowered.

A result of the advanced division of labour is increased specialization.

Men are much more likely to discover easier and readier methods of attaining any object, when the whole attention of their minds is directed towards that single object then when it is dissipated among a great variety of things. It is naturally to be expected therefore that some one or other of those who are employed in each particular branch of labour should soon find out easier and readier methods of performing their own particular work, whenever the nature of it admits of such improvement.

Just as the division of labour is a precondition for the mechanization of work processes and for industrialization as a whole, it has made university study at a distance possible. The division of labour is the main prerequisite for the advantages of this new form of teaching to become effective. The principle of the division of labour is thus a constituent element of distance teaching.

The 'complete work process', which is split in distance teaching, consists of the teaching activity of the university lecturer: namely, the entirety of the measures he takes in order to initiate and guide learning processes in students. Initially, the two basic functions of the university teacher, that of conveying information and that of counselling, were allocated as separate responsibilities in distance teaching departments of universities or colleges. Both functions, above all however that of transmitting information, are now even further divided. If, for example, the number of students enrolled on a distance study course is high, regular assessment of performance is not carried out by those academics who developed the course. The recording of results is the responsibility of yet another unit; and the development of the course itself is divided into numerous phases, in each of which experts in particular fields are active.

This specialization may bring the following advantages:

- Materials required for the development of the distance study course can be assembled by leading experts in the specialist fields concerned;
- Having completed the manuscript, the author can then be freed from the time-consuming processes of exact source references and of lecturing;
- Educationists and experienced practitioners of distance teaching are able to revise the manuscripts of study units in order to make the planned teaching process more effective;
- Colleagues from the 'academic middle tier' may be

involved in the correction of exercises carried out by students. There are cases where even senior students have taken or such tasks especially where they are concentrating on marking the exercises from a limited number of correspondence units. As in the industrial manufacturing process, the level of previous training may be lower on account of the division of labour and, as there, 'more people are able to carry out the work'. Since with extensive specialization of this type the number of scripts one university teacher is able to mark may be much higher, this process is also cheaper.

Mechanization

Mechanization means the use of machines in a work process. These machines replace the work done by the muscles of men or animals. In part they even take over elements of brain work. There are varying degrees of mechanization. The pre-industrial stage is characterized mainly by craftwork making use of tools. The first level of industrialization was reached with the use of 'dependent machines'. The second level of industrialization led to mass production as a result of the use of 'semi-independent machines' and assembly lines. Finally, the third level of industrialization is characterized by the spread of automation. The changes occurring at each level are so great that, in this context, one author has spoken about a first, second and third technical or industrial revolution .

In order to stay with this analogy, distance study could be ascribed to be industrial levels, as it cannot take place without the use of machines. Duplicating machines and transport systems are prerequisites, and later forms of distance teaching have the additional facilities of modern means of communication and electronic data processing installations.

In contrast, when considering the framework of conventional study, one cannot help thinking that its forms of teaching belong to the pre-industrial level. There the university teacher is comparable to a craftsman as he uses 'tools' (pictures, objects, books), without these changing the structure of the teaching process to any considerable degree.

Assembly line

Buckingham referred to the importance of the assembly-line principle in connection with the use of machines. Both these factors, among others, had made mass production possible. Assembly-line work is characterized by the fact that the worker remains at his place of work whilst the workpieces travel past him.

The formal similarity between distance teaching and the production process becomes particularly noticeable here. In the development of the distance study course the manuscript is passed from one area of responsibility to another and specific changes are made at each stage. The study units are printed on a large scale, stored, sent to the distance learner, who completes them, sent to the script marker who checks the work, and finally submitted to the administration, where the performance of the distance learner and the effort of the script marker are recorded. The rationalization effect achieved by the fact that many university teachers and thousands of students do not have to meet in one place in order to participate in teaching events is at least the same as that which a car manufacturer tries to achieve when, instead of sending the worker to the vehicle to be built, he transports the necessary parts to the worker. In both cases-the production process as well as distance teaching-time, energy and money are saved.

Mass production

In modern sociology the term 'mass trend' has rid itself of its negative cultural connotation, making it a largely neutral expression. Mass trend nowadays merely denotes a structural characteristic of an advanced industrial society and indicates 'that in a pure consumer society such as ours, the rise in the standard of living is due purely to the fact that industry produces certain consumer goods and commodities in large quantities, thus making them generally accessible'.

Mass production is by its nature only possible where there is a sufficiently large 'mass of consumers'. This, in turn, requires an efficient transport system providing a connection between producer and consumer who, as is typical in today's system, are geographically distant. In order to work profitably, producers need to research consumer requirements and find standards acceptable to all consumers for their products. They must continually improve their goods (aim at perfection), as each shortcoming is multiplied by the number of items produced.

If one equally rids the term 'consumer' of its negative cultural connotation, one can speak of the student as a 'consumer of academic education'. Quite obviously, 'demand' outstrips 'supply' at universities and colleges, and this had led to the large-scale operation at our universities and colleges. As traditional forms of academic teaching originally envisaged small groups of students, and today's practice of applying methods designed for small groups to large groups must be seen as a perversion f an educational concept, one can, one can understand it if various governments see distance teaching, on account of its similarity with the mass-production process, as a means of providing very large groups of students more adequately with academic teaching than conventional methods would allow.

Indeed, the multiplication effect achieved by technology and the postal delivery system means that the university teacher and the distance learner - like producer and consumer -no longer need to live in the same geographical location.

From an economic point of view, the production of distance study courses represents mass production. Apart from reasons of profitability, the large number of courses produced forces distance teaching organizations to analyse the requirements of potential distance learners far more carefully than in conventional teaching and to improve the quality of the courses. For example, in the USSR the Public Accounts Authority complained at one time that too many students dropped out of distance study, and it is suspected that this might have been the reason that led to an examination of the study materials. Most American distance study courses are revised and re-issued at regular intervals. As American universities charge fees to cover the greatest part of the budget allocated to distance teaching departments, the quality of distance study courses must not be allowed to deteriorate. When, on account of mass production, the University of California has more distance study courses to offer than there is demand for them, it occasionally places advertisements for students in newspapers.

Statistics prove that the number of graduates in areas without a university is lower than in areas near universities. It is possible that, according to the principle of mass production, distance teaching will one day equalize the opportunities to study, just as industrial mass production has assimilated consumer patterns in town and country. Analogous to the increase in the standard of living, this would make a general increase in the level of education possible, which might not otherwise have been achieved.

Preparatory work

In a production situation where a division of labour prevails, economy, quality and speed of the work process depend on the right type of preparation. This is necessary in industries producing a type of preparation. This is necessary in industries producing a variety of articles and needs to be carried out by senior specialist staff in special departments, as workers, foremen and masters involved in the production process lack the necessary knowledge and experience. During the preparatory stages one determines how workers, machines and materials can usefully relate to one another during each phase of the production process. In addition, there are developmental and constructional tasks. The more thorough the preparation, the less is a successful production process dependent on the particular abilities of the workers involved. Consequently, workers can easily be exchanged. Normally, considerably larger sums of investment are required for preparatory work than was the case previously in the manufacture of goods.

As distance teaching institutions have to develop a great variety of distance teaching courses, the comparison with a firm producing a variety of goods comes to mind. In distance teaching too success depends decisively on a 'preparatory phase'. It concerns the development of the distance study course involving experts in the various specialist fields with qualifications also often higher than those of other teachers involved in distance study. Here, too, each section of the course can be carefully planned. The use of technical support and a suitable combination of this with individual contributions from distance tutors and advisers play an important role here. Compared to university teachers in conventional study, who are responsible for the entire teaching process, distance tutors and advisers are more easily exchangeable on account of the thorough preparatory work. Finally, the development of distance study courses also requires investment to an extent that has never before been considered at establishments of higher education.

The separation of preparatory work and individual instruction and the distribution of these function among several persons is a particularly clear example of analogy with the production process.

Planning

An essential element of preparation is planning, which needs to be far more comprehensive and detailed in the industrial manufacturing process than in manual production, as it requires the coordination of many interacting factors. By planning we mean that 'system of decisions which determines an operation prior to it being carried out'. In more detail this means that 'all measures necessary for the economical execution of an order - from placement to delivery - must be introduced according to plan.

Management science distinguishes two methods of planning. Effective planning consists of choosing the most advantageous of several alternatives and forecasting the future development of data. Contingency planning is applied where marked situations suddenly change.

In the developmental phase of a distance study course planning plays an important role, as the contents of correspondence units, from the first to the last, must be determined in detail, adjusted in relation to each other and represented in a predetermined number of correspondence units. Where instance study is supplemented by residential weeks on campus or weekend seminars, planning becomes even more important; these supplementary teaching events are not intended to repeat academic contents already offered, nor have an 'enrichment' function, but should be structurally integrated in the distances study course. When combining distance teaching with other media, one has to consider carefully which type of contents suits what medium. Finally, where computers are used in distance study, preparatory planning is most advanced and demands by far the greatest expenditure, as the teaching activity of the computers needs to be programmed.

In all these efforts to predetermine and arrange the course of teaching processes as far as possible, we are dealing with effective planning. Intervention by advisers and tutors during the course of distance study, however, is regarded as contingency planning, which supplements effective planning.

Organization

Planning largely concerns itself with the organization of the production cycle. In organizational management terms, organization means 'creating general or permanent arrangements for purpose-orientated activity'. As a consequence of the division of labour, the production process has to be rationally ordered according to organizational principles and with specially developed organizational means, since 'the continuous interacting of numerous people towards a specific purpose requires organization'. Furthermore, productivity depends on the type and degree of organization. Distinguished from organization are improvisation and disposition.

In distance study, likewise, there is an immediate connection between the effectiveness of the teaching method and rational organization. Organization, for example, makes it possible for students to receive exactly predetermined documents at appointed times, for an appropriate university teacher to be immediately available for each assignment sent in, for consultations to take place at fixed locations at fixed times, or for examinations to be held, or for counsellors to inform themselves at any time of the progress of a student or a group of students. Organization becomes easier in large distance teaching establishments, as trained personnel and modern means of organization are available. These enable them to supplement the organization of distance teaching with improvisation and disposition.

The importance of organization in distance teaching can be assessed by the fact that it is often difficult to distinguish between the operational (technical organization of distance study and the methodical organization of the actual academic contents.

Formalization

On account of the division of labour and mechanization in the manufacturing process there is a much greater need to predetermine the various phases formally than in manual production. It is only the emphasis on formality which makes the cooperation of all those involved in the production process possible, as each of them has to rely on previous work having been carried out according to plan. Most activities and interactions in an industrial set-up must therefore be determined according to agreed rules.

In distance study, likewise, all the points in the cycle, from student to distance teaching establishment to the academics allocated, must be determined exactly. Communication is standardized by the use of forms. Authors of correspondence units are recommended to consider the incorporation of standard formalized aspects that have proved to be of advantage. Lecturers marking assignments also work to standard guidelines. Assessment is, in parts, largely formalized through the frequent use of multiple choice questions, where the student only has to place a cross against the right answer. In the most modern forms of distance teaching, formalization goes as far as students marking the results of their learning on a punch card in coded form, and this is then input to a computer.

Standardization

It is characteristic of a production situation involving the division of labour and high technology that manufacture is limited to a number of types of one product, in order to make these more suitable for their purpose. cheaper to produce and easier to replace. Georages Friedmann pointed out that this does not at all represent a threat of dullness and uniformity. On the contrary, the elementary parts produced could be combined in extremely diverse ways.

The application of the principle of the division of labour and the use of machines, as well as the duplication of correspondence units in often large numbers, force distance teaching institutions likewise to adopt a greater degree of standardization than is required in conventional teaching. Not only is the format of the correspondence units standardized, so also is the stationery for written communication between student and lecturer, and the organizational support, as well as each single phase of the teaching process, and even the academic contents.

Whereas the academic giving a conventional lecture may indulge in an interesting deviation, because he sees educational advantages in this at a particular time with a certain group of students, the distance study lecturer has to be aware that he is, when writing a correspondence unit, addressing such a large group of students that situation-dependent improvisation becomes impossible. Instead he has to find a standard adequate, as far as possible, for every student admitted to the distance study course in question. This is achieved by developing a model for the course, perfecting it through the involvement of several experts and then approximating it to the required standard by testing it on a representative group of students before printing large number of copies. Just as the production of a branded article can only remain economical if its quality is continuously adapted to the constant needs of a large group of consumers, a distance teaching institution has to standardize the academic contents of its courses in such a way that it can be sure they appeal to all distance learners as equally as possible. The adaptation to any number of students, however large, forces the lecturer more strongly than in conventional study to consider the necessary standard that is, at the same time, realistic for as many students as possible.

Consequently, the choice of contents of a distance study course is less likely to be a reflection of the particular interest of an academic giving conventional lectures, than of the objective requirements of the total course profile.

Change of function

On account of the division of labour and the use of various types of machines, the function of the worker in the production process has changed considerably. Whereas it was typical for the craftsman to plan the production of a piece of work as well as acquire the necessary materials, carry out the work and finally sell the finished piece of work himself, industrialization led to a more marked functional differentiation. When preparatory work and selling became separate from production and, within these three phases, many individual functions were allocated to different individual, a loss of function naturally occurred for each single worker. On the other hand, new roles were created and new achievements became possible. For example, 'in jobs where, due to mechanization, the processing of the material has been taken out of the worker's hand, speed and energy of execution are no longer required: they have been replaced by accuracy and diligence; the work no longer shows quantitative but qualitative criteria'.

As a result of the division of labour, the function of the lecturer teaching at a distance also changes. The original role of provider of knowledge in the form of the lecturer is split into that of study unit author and that of marker; the role of counsellor is allocated to a particular person or position. Frequently, the original role of lecturer is reduced to that of a consultant whose involvement in distance teaching manifests itself in periodically recurrent contributions. In order to ensure the effectiveness of the four functions mentioned, numerous support functions of an operational-technical type are particularly important, as, without them, distance study could not take place.

As tutors and consultants have largely been relieved of the task of conveying course matter, they are able to devote themselves to a considerable degree to more demanding tasks, such as aiding motivation, providing individual support, structuring course contents for students, identifying problems, establishing connections and so on. Here, too, a loss of function is compensated for by a gain in function whereby, at the same time, an otherwise almost unattainable level of quality can be achieved.

Objectification

The more the production process is determined by machines and organizational principles, the more it loses its subjective element which used to determine craftsmen's work to a considerable degree. Hermann Schmidt pointed out that this process already started when man began to substitute tools provided by nature, such as hands, fists and teeth, with tools taken from his surroundings. Objectification was not possible until the item to be objectified had become the subject of reflection.Considering that, since Frederick Winslow Taylor, there has been a changeover to analysing each single phase of the industrial production process with scientific means and to organizing purposefully the contribution of workers and machines accordingly, it becomes clear what a high degree of objectification has been achièved. This development has found a climax in automated production where man's involvement in the course of the production process has largely been eliminated.

In this respect too, the relationship between distance study and conventional study is the same as between industrial production and mechanical fabrication. The university lecturer who lectures from his chair or leads a seminar discussion has the freedom and the opportunity to allow his subjectivity to influence his way of teaching: he is free to decide how and how much to prepare, he determines his own academic aims and methods and is able to change them spontaneously during a lecture, whereby not all the changes in his teaching method need to be reflected. In distance teaching, however, most teaching functions are objectified as they are determined by the distance study courses as well as technical means. Only in written communications with the distance learner or possibly in a consultation or the brief additional face-to-face events on campus has the teacher some individual scope left for subjectively determined variants in his teaching method. In cases where a computer is used in distance study, even this opportunity is limited further.

The advantages of objectifying the teaching process in the form of a distance study course lie in the fact that the teaching process can then be reproduced, thus making it available at any time and, above all, that it can be manipulated. Without objectification distance study courses could not take place anywhere and at any time and be continuously improved.

The objectification of teaching practice in distance study is of particular importance in societies where, on account of an hierarchic structure of universities and colleges, the function of the provider of knowledge is combined in many academic with that of a holder of very great authority. As a result of this the relationship between student and lecturer is similar to that of subordinate and superior. As distance study has largely been freed from subjectivity, the process of providing knowledge is hardly affected by situations of this kind. In this context, distance study is particularly suitable for the further education of adults.

Concentration and centralization

The investment required for mechanized mass production involving the division of labour has led to large industrial concerns with a concentration of capital, a frequently centralized administration, and a market that is not seldom monopolized.

In this context it is significant that some distance teaching establishments cater for very large groups of students. The largest universities teaching at a distance in the USSR and in South Africa have over 40,000 students, and the Open University in England has more than 70,000. Each of these three establishments - as well as their Spanish equivalent - caters for the national demand. Obviously, a minimum number of students is necessary to make the technical installations and the establishment of an efficient organization feasible. Economically, it is therefore more worthwhile to create a large central distance study establishment rather than ten or twenty small regional institutions. Just as the industrial markets for certain products have long expended beyond narrow regional frontiers, such centralized distance teaching establishments must cross the traditional areas of the responsibility of universities and the educational administration.

If all the said principles of distance teaching are rigorously applied, monopoly-like prestige positions in teaching activity are created for leading experts in various disciplines. Just as no record producer would use a mediocre singer when he can engage a Fischer Dieskau, a distance teaching institution has to try and gain the best lecturers in their field for the development of its distance study courses. Just as in industry, however, one must ensure that such monopoly-like positions do not hinder free competition.

The possible consequences of a rigorous concentration and centralization of distance teaching were hinted at, for the first time in 1966, in a memorandum from the British government concerning the then proposed University of the Air. In future, universities would no longer pursue the same objectives in all subjects, but specialize in some disciplines and cater for the national requirements for distance study in these.

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Distance Teaching and Industrial Production

The more one attempts to grasp and explain the phenomenon of distance teaching, and especially the more one tries to identify the particular educational opportunities distinguishing this form of teaching from other forms of imparting academic knowledge, the clearer it becomes that the conventional range of educational terminology is not sufficiently comprehensive. Distance study represents facts new to education in several aspects. Compared with other forms of study it was novel in the form in which it made its first breakthrough over ninety years ago. With even greater justification it can be called novel in its present form in which it is currently spreading throughout the world, contributing towards the discovery of the educational opportunities provided by the modern media, such as radio and television. It is, above all, novel and pointing towards the future when it makes use of electronic data-processing equipment and wide-band cable transmission techniques. It is no coincidence that university study at a distance, in its early form of correspondence teaching, began its development only about 130 years ago, as it requires conditions that only existed from then on. One necessity, for example, is a relatively fast and regular postal and transport service. The first railway lines and the first correspondence schools were established around the same time. When one further realizes how much technical support distance teaching establishment need nowadays in order to cater effectively for large groups of students, it becomes clear that distance study is a form of study complementary to our industrial and technological age. Lectures, seminars and practice sessions, on the other hand, have developed from forms of teaching derived from ancient rhetoric and were practised at medieval universities; the colloquium originates from the dialogic teaching methods of the humanistic era. These forms of teaching have changed little in their basic structure since the beginning of the nineteenth century. They proved almost completely resistant to combination with technical support facilities. In this context they can therefore be described as pre-industrial forms of study.

On account of these differences, distance study can only be described and analysed to a limited extent using traditional educational terms. They are not wholly adequate for this new form of study. This is understandable in so far as these terms developed from pre-industrial forms of teaching. If one applies them to distance study one will think in conventional concepts. To emphasize the point, one looks at a new form of study from an old perspective and has one's view of the essential structural characteristics distorted.

Industrialization is the symbol of a new epoch in the development of man fundamentally different from all previous epochs. It is without example in history, above all, on account of the basic changes in most spheres of human existence. Academic teaching alone seems to have remained largely unscathed by industrialization - with the exception of distance study, for this form of study is remarkably consistent with the principles and tendencies of industrialization. For this reason, experimentally, structural elements, concepts and principles derived from the theories of industrial production are used here to interpret the distance study phenomenon. This does not mean that the teaching and learning processes occurring in distance study are equated with processes in industrial production. The comparison is purely heuristic.

A comparison of this kind between a form of teaching and processes from another sphere of life is legitimate and not without example in the history of educational theory. Amos Comenius, the 'founder and virtuoso of the method of parallel comparison' in his *Didactical Magna,* for example, compared the 'art of teaching' in unusual detail with the art of printing, also a technical process. Theodor Litt identified the nature of pedagogic thinking by comparing it with artistic creativity, technology and the processes of growth. In the sixties, experiments were carried out which tried to explain the teaching and learning processes using the technical model of the feedback control system, in order to find approaches to a 'cybernetic pedagogy' . Most impressive, however, was the achievement of Gottfried Hausmann who, in 1959, condensed the analogy between the dramatic arts and education into a 'dramaturgy of teaching'. In it he interprets the educational structure of teaching and learning processes in detail using the terms and principles of the dramatic are in the theatre. Paul Heimann saw the merit of this comprehensive and detailed comparison in the possibility that 'it might give rise to a complete revision of our teaching and learning models'.

Furthermore, it may not be without significance for this planned interpretation that for another important aspect of university or college work, namely research, comparisons with the production process already exist. In 1919, Max Weber defined structural similarities between research institutes and capitalistic organizations and, in 1924, Helmut Plessner pointed out that the 'mechanization, methodization and depersonalization of the manufacturing process equally dominate the production of economic as well as cultural goods'. The following comparison between distance study and the industrial production process will prove similar consistencies.

From the start, distance study has a special relationship with the industrial production process in so far as the production of study materials in itself is an industrial process built into the whole teaching process as a constituent part, quite unlike the production of textbooks, for example. In the case of commercial distance teaching establishments the further question of selling the printed or otherwise duplicated study units adds calculations of applied economics to the teaching process. Even the distance teaching departments of government-financed universities are not entirely free from these considerations. It would be interesting to examine how far these facts have already influenced the structure of distance teaching.

In order to facilitate the discovery of further relationships between distance teaching and the production process, the following structural changes - essentially brought about by industrialization - in the development of the production of goods should be noted:

1 According to the principle of rationalization, individual work as was traditional in the craftsmen's trades changes at an early stage to a production based on the division of labour (e.g., in factories), and this later leads to the development of assembly lines and mass production.

2 Work processes initially characterized by the use of tools are increasingly restructured by mechanization and, later, automation.

3 In detail, these changes lead to the following results:

   - The preparatory phase becomes increasingly important;
   - Success depends, among other things, on systematic planning and organization. Scientific measures of control are needed;
   - Work processes must be formalized and products standardized. The production process is objectified;
   - Each developmental step towards increased mechanization leads to changes in the function of those involved in the production process;
   - Small concerns are no longer able to raise the investment needed for developmental work and

> technical equipment. A strong tendency towards concentration and centralization becomes noticeable.

The terms used in business studies to describe these facts will be outlined briefly and - where possible - applied to distance teaching.

Rationalization

By rationalization we mean all 'methodical' (that is, rationally guided) 'measures' with the purpose of achieving 'output with a comparatively (compared to earlier situations) lower input of power, time and money'. Scientific discoveries should 'be evaluated for practical use in such a way as to achieve the best possible results in view of the continually necessary development and redevelopment of economic and technical processes'.

Applied to the practical example of the production process this means that 'the entire production line, from raw material to end product, is carefully analysed to allow each single work process to be planned so as to make the most effective contribution possible towards achieving clearly formulated business tasks.

Georges Friedmann emphasizes that this is a dynamic process aiming at continuous improvement in quality through continuous progress in the study of materials, accuracy and precision'. Rationalisation of this type has only started to develop with increasing industrialization at the end of the nineteenth century.

Management science holds that the reason for the considerable obstacles to rationalization lies in human nature itself, because 'human inadequacy inhibits the motivation to gain unprejudiced views and the willingness to act according to rational convictions'. Further obstacles are considered to be tradition, convention, habits and fashion. In education, a rationalizing way of thinking is nothing new. In a general form, it influences the reasoning for numerous educational decisions. For example, the introduction of lectures to larger groups of students, the use of printed books and the specialization of university lecturers were considerable steps towards the rationalization of the academic teaching process. Every university teacher will, when planning a lecture, choose those subjects that will best help him or her to fulfil the purpose of that particular lecture. In distance teaching, however, ways of thinking, attitudes and procedures can be found which only established themselves in the wake of an increased rationalization in the industrialization of production processes. The characteristic details are, among others, as follows:

1 In distance study the teaching process is based on the division of labour and detached from the person of the university lecturer. It is therefore independent from a subjectively determined teaching situation, thus eliminating part of the earlier mentioned obstacles to rationalization. The division of labour and the objectification of the teaching process allow each work process to be planned in such a way that clearly formulated teaching objectives are achieved in the most effective manner. Specialists may be responsible for a limited area in each phase;

2 The use of technical equipment (duplicating machines, organization systems, transporting devices) makes it possible to convey the knowledge, ability and teaching skills of a university lecturer, by means of the detached objectivity of a distance study course of constant quality, to a theoretically unlimited number of students. The rationalization effect of mass production becomes apparent here;

3 The rigorous application of organizational principles and means saves teachers as well as students unnecessary effort;

4 At some of the newer distance teaching establishments, modern means of technical support, such as film, television and electronic data-processing installations,

have replaced teaching staff in certain areas of their work, in particular, in the fields of giving information and assessing performance;

5 Student work through a course which has been tested prior to going to print. This prevents misunderstandings and stops students from going in the wrong direction;

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If the number of students required in a society outgrows the number of university teachers available, rational thinking should be able to find ways and means of changing teaching methods in such a way that the teaching resources of the university teachers available are used to the best effect, quantitatively as well as qualitatively. Distances study can be regarded as a result of such endeavours.

The division of labour

The division of labour has played an important role in the sociological theories of the last 100 years. Applied to the production processes it means that the work is split in the sense of 'dividing one complete work process into a number of elementary procedures', as described by Adam Smith at an early stage. With an extensive division of labour 'training periods become shorter, more people are able to carry out the work and wages can be lowered.

A result of the advanced division of labour is increased specialization. The following statement, by Adam Smith in 1776, applies to everyone involved in a production process where a division of labour exists:

> Men are much more likely to discover easier and readier methods of attaining any object, when the whole attention of their minds is directed towards that single object then when it is dissipated among a great variety of things. It is naturally to be expected therefore that some one or other of those who are employed in each particular branch of labour should soon find

out easier and readier methods of performing their own particular work, whenever the nature of it admits of such improvement.

Just as the division of labour is a precondition for the mechanization of work processes and for industrialization as a whole, it has made university study at a distance possible. The division of labour is the main prerequisite for the advantages of this new form of teaching to become effective. The principle of the division of labour is thus a constituent element of distance teaching.

The 'complete work process', which is split in distance teaching, consists of the teaching activity of the university lecturer: namely, the entirety of the measures he takes in order to initiate and guide learning processes in students. Initially, the two basic functions of the university teacher, that of conveying information and that of counselling, were allocated as separate responsibilities in distance teaching departments of universities or colleges. Both functions, above all however that of transmitting information, are now even further divided. If, for example, the number of students enrolled on a distance study course is high, regular assessment of performance is not carried out by those academics who developed the course. The recording of results is the responsibility of yet another unit; and the development of the course itself is divided into numerous phases, in each of which experts in particular fields are active.

This specialization may bring the following advantages:

- Materials required for the development of the distance study course can be assembled by leading experts in the specialist fields concerned;
- Having completed the manuscript, the author can then be freed from the time-consuming processes of exact source references and of lecturing;
- Educationists and experienced practitioners of distance teaching are able to revise the manuscripts of study units

in order to make the planned teaching process more effective;

- Colleagues from the 'academic middle tier' may be involved in the correction of exercises carried out by students. There are cases where even senior students have taken or such tasks especially where they are concentrating on marking the exercises from a limited number of correspondence units. As in the industrial manufacturing process, the level of previous training may be lower on account of the division of labour and, as there, 'more people are able to carry out the work'. Since with extensive specialization of this type the number of scripts one university teacher is able to mark may be much higher, this process is also cheaper.

Mechanization

Mechanization means the use of machines in a work process. These machines replace the work done by the muscles of men or animals. In part they even take over elements of brain work. There are varying degrees of mechanization. The pre-industrial stage is characterized mainly by craftwork making use of tools. The first level of industrialization was reached with the use of 'dependent machines'. The second level of industrialization led to mass production as a result of the use of 'semi-independent machines' and assembly lines. Finally, the third level of industrialization is characterized by the spread of automation.

In order to stay with this analogy, distance study could be ascribed to be industrial levels, as it cannot take place without the use of machines. Duplicating machines and transport systems are prerequisites, and later forms of distance teaching have the additional facilities of modern means of communication and electronic data processing installations.

In contrast, when considering the framework of conventional study, one cannot help thinking that its forms of teaching belong to the pre-industrial level. There the university teacher is comparable to a craftsman as he uses 'tools' (pictures, objects, books), without these changing the structure of the teaching process to any considerable degree.

Assembly line

Buckingham referred to the importance of the assembly-line principle in connection with the use of machines. Both these factors, among others, had made mass production possible. Assembly-line work is characterized by the fact that the worker remains at his place of work whilst the workpieces travel past him.

The formal similarity between distance teaching and the production process becomes particularly noticeable here. In the development of the distance study course the manuscript is passed from one area of responsibility to another and specific changes are made at each stage. The study units are printed on a large scale, stored, sent to the distance learner, who completes them, sent to the script marker who checks the work, and finally submitted to the administration, where the performance of the distance learner and the effort of the script marker (to calculate fees) are recorded. The rationalization effect achieved by the fact that many university teachers and thousands of students do not have to meet in one place in order to participate in teaching events is at least the same as that which a car manufacturer tries to achieve when, instead of sending the worker to the vehicle to be built, he transports the necessary parts to the worker. In both cases-the production process as well as distance teaching-time, energy and money are saved.

Mass production

In modern sociology the term 'mass trend' has rid itself of its negative cultural connotation, making it a largely neutral expression. Mass trend nowadays merely denotes a structural characteristic of an advanced industrial society and indicates 'that in a pure consumer society such as ours, the rise in the standard of living is due purely to the fact that industry produces certain consumer goods and commodities in large quantities. thus making them generally accessible'.

'Mass production is by its nature only possible where there is a sufficiently large mass of consumers'. This, in turn, requires an efficient transport system providing a connection between producer and consumer who, as is typical in today's system, are geographically distant. In order to work profitably, producers need to research consumer require-ments and find standards acceptable to all consumers for their products. They must continually improve their goods, as each shortcoming is multiplied by the number of items produced.

If one equally rids the term 'consumer' of its negative cultural connotation, one can speak of the student as a 'consumer of academic education'. Quite obviously, 'demand' outstrips 'supply' at universities and colleges, and this had led to the large-scale operation at our universities and colleges. As traditional forms of academic teaching originally envisaged small groups of students, and today's practice of applying methods designed for small groups to large groups must be seen as a perversion f an educational concept, one can, one can understand it if various governments see distance teaching, on account of its similarity with the mass-production process, as a means of providing very large groups of students more adequately with academic teaching than conventional methods would allow.

Indeed, the multiplication effect achieved by technology and the postal delivery system means that the university teacher and the distance learner – like producer and consumer -no longer need to live in the same geographical location.

From an economic point of view, the production of distance study courses represents mass production. Apart from reasons of profitability, the large number of courses produced forces distance teaching organizations to analyse the requirements of potential distance learners far more carefully than in conventional teaching and to improve the quality of the courses. Most American distance study courses are revised and re-issued at regular intervals. As American universities charge fees to cover the greatest part of the budget allocated to distance teaching departments, the quality of distance study courses must not be allowed to deteriorate. When, on account of mass production, the University of California has more distance study courses to offer than there is demand for them, it occasionally places advertisements for students in newspapers.

Statistics prove that the number of graduates in areas without a university is lower than in areas near universities. It is possible that, according to the principle of mass production, distance teaching will one day equalize the opportunities to study, just as industrial mass production has assimilated consumer patterns in town and country. Analogous to the increase in the standard of living, this would make a general increase in the level of education possible, which might not otherwise have been achieved.

Preparatory work

In a production situation where a division of labour prevails, economy, quality and speed of the work process depend on the right type of preparation. This is necessary in industries producing a type of preparation. This is necessary in industries producing a variety of articles and needs to be carried out by senior specialist staff in special departments, as workers, foremen and masters involved in the production process lack the necessary knowledge and experience. During the preparatory stages one determines how workers, machines and materials can usefully relate to one another during each phase of the production process. In addition, there are developmental and constructional tasks. The more thorough the preparation, the less is a successful production process dependent on the particular abilities of the workers involved. Consequently, workers can easily be exchanged. Normally, considerably larger sums of investment are required for preparatory work than was the case previously in the manufacture of goods.

As distance teaching institutions have to develop a great variety of distance teaching courses, the comparison with a firm producing a variety of goods comes to mind. In distance teaching too success depends decisively on a 'preparatory phase'. It concerns the development of the distance study course involving experts in the various specialist fields with qualifications also often higher than those of other teachers involved in distance study. Here, too, each section of the course can be carefully planned. The use of technical support and a suitable combination of this with individual contributions from distance tutors and advisers play an important role here. Compared to university teachers in conventional study, who are responsible for the entire teaching process, distance tutors and advisers are more easily exchangeable on account of the thorough preparatory work. Finally, the development of distance study courses also requires investment to an extent that has never before been considered at establishments of higher education.

The separation of preparatory work and individual instruction and the distribution of these function among several persons is a particularly clear example of analogy with the production process.

Planning

An essential element of preparation is planning, which needs to be far more comprehensive and detailed in the industrial manufacturing process than in manual production, as it requires the coordination of many interacting factors. By planning we mean that 'system of decisions which determines an operation prior to it being carried out'. In more detail this means that 'all measures necessary for the economical execution of an order - from placement to delivery — must be introduced according to plan.

Management science distinguishes two methods of planning. Effective planning consists of choosing the most advantageous of several alternatives and forecasting the future development of data. Contingency planning is applied where marked situations suddenly change.

In the developmental phase of a distance study course planning plays an important role, as the contents of correspondence units, from the first to the last, must be determined in detail, adjusted in relation to each other and represented in a predetermined number of correspondence units. Where instance study is supplemented by residential weeks on campus or weekend seminars, planning becomes even more important; these supplementary teaching events are not intended to repeat academic contents already offered, nor have an 'enrichment' function, but should be structurally integrated in the distances study course. When combining distance teaching with other media, one has to consider carefully which type of contents suits what medium. Finally, where computers are used in distance study, preparatory planning is most advanced and demands by far the greatest expenditure, as the teaching activity of the computers needs to be programmed.

In all these efforts to predetermine and arrange the course of teaching processes as far as possible, we are dealing with effective planning. Intervention by advisers and tutors during the course of distance study, however, is regarded as contingency planning, which supplements effective planning.

Organization

Planning largely concerns itself with the organization of the production cycle. In organizational management terms, organization means 'creating general or permanent arrangements for purpose-orientated activity'. As a consequence of the division of labour, the production process has to be rationally ordered according to organizational principles and with specially developed organizational means, since 'the continuous interacting of numerous people towards a specific purpose requires organization'. Furthermore, productivity depends on the type and degree of organization.

In distance study, likewise, there is an immediate connection between the effectiveness of the teaching method and rational organization. Organization, for example, makes it possible for students to receive exactly predetermined documents at appointed times, for an appropriate university teacher to be immediately available for each assignment sent in, for consultations to take place at fixed locations at fixed times, or for examinations to be held, or for counsellors to inform themselves at any time of the progress of a student or a group of students. Organization becomes easier in large distance teaching establishments, as trained personnel and modern means of organization are available. These enable them to supplement the organization of distance teaching with improvisation and disposition.

The importance of organization in distance teaching can be assessed by the fact that it is often difficult to distinguish between the operational (technical organization of distance study and the methodical organization of the actual academic contents.

Formalization

On account of the division of labour and mechanization in the manufacturing process there is a much greater need to predetermine the various phases formally than in manual production. It is only the emphasis on formality which makes the cooperation of all those involved in the production process possible, as each of them has to rely on previous work having been carried out according to plan. Most activities and interactions in an industrial set-up must therefore be determined according to agreed rules.

In distance study, likewise, all the points in the cycle, from student to distance teaching establishment to the academics allocated, must be determined exactly. Communication is standardized by the use of forms. Authors of correspondence units are recommended to consider the incorporation of standard formalized aspects that have proved to be of advantage. Lecturers marking assignments also work to standard guidelines. Assessment is, in parts, largely formalized through the frequent use of multiple choice questions, where the student only has to place a cross against the right answer. In the most modern forms of distance teaching, formalization goes as far as students marking the results of their learning on a punch card in coded form, and this is then input to a computer.

Standardization

It is characteristic of a production situation involving the division of labour and high technology that manufacture is limited to a number of types of one product, in order to make these more suitable for their purpcse. Cheaper to produce and easier to replace. Georages Friedmann pointed out that this does not at all represent a threat of dullness and uniformity. On the contrary, the elementary parts produced could be combined in extremely diverse ways.

The application of the principle of the division of labour and the use of machines, as well as the duplication of correspondence units in often large numbers, force distance teaching institutions likewise to adopt a greater degree of standardization than is required in conventional teaching. Not only is the format of the correspondence units standardized, so also is the stationery for written communication between student and lecturer, and the organizational support, as well as each single phase of the teaching process, and even the academic contents.

Whereas the academic giving a conventional lecture may indulge in an interesting deviation, because he sees educational advantages in this at a particular time with a certain group of students, the distance study lecturer has to be aware that he is, when writing a correspondence unit, addressing such a large group of students that situation-dependent improvisation becomes impossible. Instead he has to find a standard adequate, as far as possible, for every student admitted to the distance study course in question. This is achieved by developing a model for the course, perfecting it through the involvement of several experts and then approximating it to the required standard by testing it on a representative group of students before printing large number of copies. Just as the production of a branded article can only remain economical if its quality is continuously adapted to the constant needs of a large group of consumers, a distance teaching institution has to standardize the academic contents of its courses in such a way that it can be sure they appeal to all distance learners as equally as possible. The adaptation to any number of students, however large, forces the lecturer more strongly than in conventional study to consider the necessary standard that is, at the same time, realistic for as many students as possible.

Consequently, the choice of contents of a distance study course is less likely to be a reflection of the particular interest of an academic giving conventional lectures, than of the objective requirements of the total course profile.

Change of function

On account of the division of labour and the use of various types of machines, the function of the worker in the production process has changed considerably. Whereas it was typical for the craftsman to plan the production of a piece of work as well as acquire the necessary materials, carry out the work and finally sell the finished piece of work himself, industrialization led to a more marked functional differentiation. When preparatory work and selling became separate from production and, within these three phases, many individual functions were allocated to different individual, a loss of function naturally occurred for each single worker. On the other hand, new roles were created and new achievements became possible. For example, 'in jobs where, due to mechanization, the processing of the material has been taken out of the worker's hand, speed and energy of execution are no longer required: they have been replaced by accuracy and diligence; the work no longer shows quantitative but qualitative criteria'.

As a result of the division of labour, the function of the lecturer teaching at a distance also changes. The original role of provider of knowledge in the form of the lecturer is split into that of study unit author and that of marker; the role of counsellor is allocated to a particular person or position. Frequently, the original role of lecturer is reduced to that of a consultant whose involvement in distance teaching manifests itself in periodically recurrent contributions. In order to ensure the effectiveness of the four functions mentioned, numerous support functions of an operational-technical type are particularly important, as, without them, distance study could not take place.

As tutors and consultants have largely been relieved of the task of conveying course matter, they are able to devote themselves to a considerable degree to more demanding tasks, such as aiding motivation, providing individual support, structuring course contents for students, identifying problems, establishing connections and so on. Here, too, a loss of function is compensated for by a gain in function whereby, at the same time, an otherwise almost unattainable level of quality can be achieved.

Objectification

The more the production process is determined by machines and organizational principles, the more it loses its subjective element which used to determine craftsmen's work to a considerable degree. Hermann Schmidt pointed out that this process already started when man began to substitute tools provided by nature, such as hands, fists and teeth, with tools taken from his surroundings. Objectification was not possible until the item to be objectified had become the subject of reflection.

In this respect too, the relationship between distance study and conventional study is the same as between industrial production and mechanical fabrication. The university lecturer who lectures from his chair or leads a seminar discussion has the freedom and the opportunity to allow his subjectivity to influence his way of teaching: he is free to decide how and how much to prepare, he determines his own academic aims and methods and is able to change them spontaneously during a lecture, whereby not all the changes in his teaching method need to be reflected. In distance teaching, however, most teaching functions are objectified as they are determined by the distance study courses as well as technical means. Only in written communications with the distance learner or possibly in a consultation or the brief additional face-to-face events on campus has the teacher some individual scope left for subjectively determined variants in his teaching method. In cases where a computer is used in distance study, even this opportunity is limited further.

The advantages of objectifying the teaching process in the form of a distance study course lie in the fact that the teaching process can then be reproduced, thus making it available at any time and, above all, that it can be manipulated. Without objectification distance study courses could not take place anywhere and at any time and be continuously improved.

The objectification of teaching practice in distance study is of particular importance in societies where, on account of an hierarchic structure of universities and colleges, the function of the provider of knowledge is combined in many academic with that of a holder of very great authority. As a result of this the relationship between student and lecturer is similar to that of subordinate and superior. As distance study has largely been freed from subjectivity, the process of providing knowledge is hardly affected by situations of this kind. In this context, distance study is particularly suitable for the further education of adults.

Concentration and centralization

The investment required for mechanized mass production involving the division of labour has led to large industrial concerns with a concentration of capital, a frequently Centralized administration, and a market that is not seldom monopolized.

In this context it is significant that some distance teaching establishments cater for very large groups of students. The largest universities teaching at a distance in the Russia and in South Africa have over 40,000 students, and the Open University in England has more than 70,000. Each of these three establishments - as well as their Spanish equivalent - caters for the national demand. Obviously, a minimum number of students is necessary to make the technical installations and the establishment of an efficient organization feasible. Economically, it is therefore more worthwhile to create a large central distance study establishment rather than ten or twenty small regional institutions. Just as the industrial markets for certain products have long expended beyond narrow regional frontiers, such centralized distance teaching establishments must cross the traditional areas of the responsibility of universities and the educational administration.

If all the said principles of distance teaching are rigorously applied, monopoly-like prestige positions in teaching activity are created for leading experts in various disciplines. Just as no record producer would use a mediocre singer when he can engage a Fischer Dieskau, a distance teaching institution has to try and gain the best lecturers in their field for the development of its distance study courses. Just as in industry, however, one must ensure that such monopoly-like positions do not hinder free competition.

The possible consequences of a rigorous concentration and centralization of distance teaching were hinted at, for the first time in 1966, in a memorandum from the British government concerning the then proposed University of the Air. In future, universities would no longer pursue the same objectives in all subjects, but specialize in some disciplines and cater for the national requirements for distance study in these.

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Distance Learning

The term 'distance education' is predominantly used in its narrower meaning. It then refers to instruction by the exchange of letters between teacher and student, a process in which the contributions of both are usually based on specially prepared and methodically developed printed course material. This form of distance education is practised in most of the correspondence schools.

The wider meaning of the term is derived from the word 'distance'. It indicates more generally any form of instruction in which it is necessary to bridge a distance between teacher and student, which can be achieved not only with the help of letters and printed course material, but also by other technical media such as telephone, radio, television, audio and video cassettes, as well as by newer electronic media.

In both definitions and this is of great importance, as it separates distance education from other forms of influencing people by giving information - *instruction* means a methodical process of imparting knowledge with the following characteristics.

- The contents of the instruction are chosen taking into account didactical and methodical considerations.
- The indirect contact between teacher and students is continued until the end of the instruction.

- There are possibilities for the teacher to influence the learning behaviour of the students.
- The learning of the students is measured and graded.

Self-instruction and *self-study,* which have been often used as synonyms for distance education, have none of these characteristics. There is, however, an intermediate stage between distance education and self-instruction, if, for instance, a student reads a series of methodically developed study materials. Such a form of instruction corresponds to face-to-face teaching in which only the teacher speaks - limiting himself or herself exclusively to the presentation of teaching material.

Supervised distance education has been used by schools which lacked teachers of certain subjects. In this case a student sits in the classroom at regular hours, studies course units and communicates with his teacher in the correspondence school somewhere else. The student - and others who might be studying different courses - is supervised by a teacher who, as a rule, does not inteerfere with the teaching-learning processes which are taking place under his eyes.

Students

As distance education is practised in many subject areas and in many countries it is difficult to describe features which are common to all students. However, if one tries to find out why they decide to enroll in distance study courses it is easy to see that most of them do so because they are prevented from attending regular day schools. If we categorize the respective impediments the distance students can be assigned to the following groups:

Group 1: Students who have to work for a living in order to support themselves and often also their family: workers who want to complete their primary or secondary school education; workers, skilled workers, and technicians who want to improve their vocational qualifications; agricultural labourers who intended to move into a town and therefore wish to prepare themselves for a new occupation; workers in occupations which come to an end and who, therefore, need retraining; immigrants who wish to obtain the citizenship of their new country and have to acquire specific knowledge about it.

Group 2: Students who live in sparsely settled areas: children of farmers in isolated areas, for instance in Canada and Australia.

Group 3: Students who live too far away from the nearest day school of their own nationality: children of diplomats, missionaries, military personnel abroad, children of experts employed in developing countries, children of persons in itinerant trades, sailors, boatmen, children of immigrants who are to be instructed in their mother tongue.

Group 4: Persons who are unable to attend regular schools for health reasons: sick persons who are bedridden, handicapped persons, children who have to stay in hospital for some time.

Group 5: Persons who are hindered from attending regular schools by the state: prisoners, children and juveniles in reformatories.

Apart from these five groups, there are distance students who do not come into this category. They might well be able to attend regular schools but prefer to enroll in distance education courses. Some do it in order to supplement the instruction of their regular school or to raise their level of general education; gifted students do it in order to reach an advanced level and still other students do it in order to find out whether they fit into a specific vocational pattern so as to clarify vocational options. Finally, there are also teachers who study courses at a distance in order to inspire and prepare themselves for teaching.

Usually there are fewer students who wish to complete their secondary education in order to obtain entrance qualification for institutes of higher learning. Many more students intend to improve their vocational qualifications.

Generally speaking, both groups belong to the higher ranks of workers and the middle ranks of salaried staff - those wide, intermediate sections of the population in industrialized countries which wish to improve their conditions of life and to climb socially. They are interested in information and eager for knowledge. Many of them can be characterized by the fact that *The Reader's Digest* recruits its readers among them. It is not coincidental that many correspondence schools like to place their advertisements in this magazine, where they have proved to be most successful.

Students who enrol in distance education do not live predominantly in rural areas although this is widely assumed as there is usually a lack of specialized schools in country areas. On the contrary, they typically dwell in big cities and overcrowded industrial regions. It is only there that many differentiated possibilities for employment and promotion prospects inspire the students to learn, that the competitiveness of industrialized production urges them to take the initiative, and that the urban environment and atmosphere provides for additional incentives.

Most students are between twenty and thirty-five years old, which means that they are adults. Their educational standard is, as a rule, above the average of the respective age group - and not lower, as again is often assumed by those who consider instance students as disadvantaged persons.

What are the motivations of distant students? The strongest one is certainly the ambition to climb socially, to change from a blue-collar job to a white-collar job. They seek economic security. This motivation is activated when the students have clear ideas of the job they want to have and when the competence they have developed so far will help them reach it. Furthermore, this motivation is supported by the fact that these students are adults who are able to judge their life chances more realistically than, say, students in secondary schools. They are conscious of the importance of their educational goals and of the consequences of reaching them.

There might be more hidden motivations. Some students decide to engage in distance education in order to protest against their parents who insisted on certain vocational training for their children. Through distance education they want to remedy early wrong decisions. The 'ambitious wife' can also be a powerful source of motivation. Sometimes, there is a revolt against discrimination in their daily work which distant students hope to escape by striving for better jobs. The great number of distant students in developing countries can perhaps be explained by similar motives.

The advertising departments of correspondence schools systematically exploit such motivations and reinforce them by creating an image of distant students which is certainly far beyond reality but nevertheless appeals to them. According to them, distant students belong to the 'intellectual elite' of the work force, have 'better chances' when applying for a new job, obtain a 'higher income', enjoy 'more prestige' and look forward to a 'happy future'. Sometimes the advertisements contain pictures under the headline: 'Formerly an employee with a low income - now a leading personality', showing all those present at a meeting of directors listening attentively to the former distant student. Another picture visualizes the success of the distant student who himself, travelling with an attractive young wife in a large sports car in a holiday paradise, is obviously able 'to afford anything'. The distant students will, of course, lower their sights depending on their maturity and life experience. But more or less subconsciously such advertisements may encourage them in their striving for success.

The motivations of distant students are also influenced by the way in which they are looked upon by society. This differs considerably from country to country, and depends on the achievements of the correspondence schools and the social structures and traditions of a given country - whether they are, for instance, capitalist or socialist. The scale of possible attitudes reaches from condescending pity and derision for the poor guys who turn themselves into drudges in order to climb the social ladder, to the firm conviction that the economic future of society depends on the qualification of numerous distant students who work and study at the same time. In the first case, distant students appear to be strange characters and outsiders, showing all the disadvantages of the self-educated: in the second case, they are considered the blue-eyed boys of the nation.

An attitude has also emerged which is located midway between these two extremes. Thus distant students are persons who take the initiative in the planning and pursuit of their careers, who have considerable will-power and perseverance in mastering a difficult task, and who are often praised for their stamina.

Teachers

In distance education, courses are usually written for an arbitrary number of students. This shows the importance of the qualification of the teachers. A bad course written by one teacher which will be studied by 10,000 students will do more harm that the oral instruction of the same teacher in a classroom. Therefore, correspondence schools try to employ teacher whose competence is higher than average. Large correspondence schools with highly differentiated course programmes employ teachers who have not only studied their subjects at a university but who also teach at institutes of higher learning: graduate engineers, businessmen, and teachers. On the other hand, they also employ experienced practitioners, leading experts and managers coming directly from the world of work.

Little is known about the educational qualifications of these teachers. Generally speaking, their competencies are mainly subject-orientated. Often they are experts in a limited field only. Educational and didactical knowledge are, as a rule, missing. Some correspondence schools like to employ experts with a special reputation or persons who have become popular—mainly for advertising purposes. A correspondence school in Paris, for instance, took pride in employing a general as well as an opera singer, and in the United States 'famous artists' founded a correspondence school in order to offer tuition in painting and writing.

On the other hand, there are correspondence schools in which teachers have not passed the examinations for which they prepare their students. As there are often no public regulations about the educational training of teachers at correspondence schools, these institutes may become places in which ambitious outsiders can stand the test as well as in which arrogant know-nothings can do a lot of harm.

As a rule, a correspondence school has a small staff of full-time and a great number of part-time employees. Many of the part-time employees are teachers in the state school system. They work as authors of course material and as correctors of assignments. Correspondence schools are happy with this arrangement as they can tell their students that they are taught by 'real' teachers. And the state schools profit from it as well, as their teachers gain new insights in the methodology of teaching when writing course materials and communicating with the distant students after having corrected the assignments. Experienced teachers can often also be found in the permanent staff of correspondence schools. Usually they are unable to work in state schools because they are retired, ill or have had to leave their schools for other reasons. Among them is also a number of younger, well-trained teachers who found that they could not cope with a normal class situation as they cannot get along with larger groups of students. They find teaching at a distance much easier and more rewarding.

The work of the teacher in distance education differs from face-to-face teaching in a classroom through the increased division of labour. This principle is fundamental in industrialized production processes. Its application to the process of instructions has therefore caused considerable resistance and, mainly emotional, opposition. Division of labour, however, is not alien to our schools and universities, although they postulate a special pedagogical relationship between teacher and student and deduce from this a holistic concept of instruction. Usually, the long-and medium-term plans for instruction are developed by special teams of experts, special subjects are taught by special teachers and the final evaluation of the learning outcomes of the students is often decided upon by meetings of all teachers in a given school. Nobody objects to a professor who conducts a seminar himself but asks his assistants to read and mark the papers of the students.

Although the principle of division of labour has already influenced the teaching and learning of our day schools, the job of the teacher remains extremely complex, as it consists of a number of different activities. At large correspondence schools, however, this complexity is reduced by splitting the job into several functions which are assigned to several departments:

- *Preparation of the instruction 1*: selection of the contents of instruction by the author in cooperation with the directorate of the school.
- *Preparation of the instruction 2*: development of manuscripts by an editorial staff according to the special requirements of distance teaching.
- *Presentation*: typographical design of the teaching material by layout specialists and designers.
- *Assessment and marking*: correction of the assignments by specialized correctors.
- *Interaction*: exchange of letters between the student and various persons in the correspondence school.
- *Administration and supervision*: control of the whole process of instruction, registering of the corrected assignments, card filings by specialists in the office.
- *Counselling*: Passing on information about courses and examinations and writing of letters reminding the students to send in the assignments by the information section and the respective distant teachers.

- *Evaluation*: Examination of the learning results of all course students, recommendations of changes to the instructions and further developmental of courses, taking into consideration new findings by educational experts of the research unit..

The most important functions are the writing of course material and the correction of papers sent in by the students. This is what most of the teachers do. The division of labour frees them from the more bothersome extra functions which can be carried out by specialists in the various departments of the school. It stands to reason that these specialists can do their job more thoroughly, reliably and effectively.

Generally, the qualities of the persons teaching at a distance must be the same as in face-to-face instruction. As their functions are, however, reduced to course writing as well as correcting and marking assignments, and as they have to specialize in these fields, they need additional qualifications. The *course writer* must have the ability to envisage the teaching-learning situation they want to create and to foresee possible difficulties of comprehending and learning, and must be able to write instead of instructing orally or lecturing—which is quite a different thing. Even more, the course writer must be able to write short, concise and succinct sentences which are understandable—a gift which is certainly not found very often.

The *corrector* must be able to react as if he or she were in a virtual instructional situation with a single student. Some correspondence schools help correctors to do so by supplying them with the student's file and photograph when sending the assignments. Their task is difficult, indeed. While they correct, mark, explain and comment they must endeavour to individualize the course material, which is, necessarily, the same for thousands of students. This can be attained by inspiring, encouraging and advising the student in such a way as is necessary in this particular teaching-learning situation. Correctors are able to devote more of their time to performing these important functions as the schools free them from written routine work. Often they use computers which print out long and very individualized letters according to the key numbers which the corrector has indicated. This very often enables them to comment upon a mistake comprehensively and to give just those hints which are required by the particular teaching-learning situation.

Some correspondence schools work with 'travelling teachers' who visit groups of distant students more or less regularly. They need special teaching skills, as they must not waste the short time available by lecturing on the topics exhibited in the course units, but must use it for identifying the most important learning difficulties and showing ways of overcoming them. This means again that the instruction is to be individualized. Furthermore, it suggests that the precious time to face-to-face instruction is also used for motivational purposes.

If the importance of correspondence schools and their possible advantages are more and more recognized their teachers will attract more public attention. It is certainly imaginable that special training courses for this group of persons will be established at teacher training colleges and at universities. For the time being, correspondence schools have to train their teachers themselves. The bigger the schools are, the easier it might be to cease improvising and to develop elaborated training procedures. The American giant correspondence school ICS, for instance, has set up a special training department which is connected with fifteen schools. Applicants are selected by tests and interviews. Then their educational and vocational backgrounds are considered. The training is strictly practice-oriented and has similarities to an apprenticeship. Trainees are assigned to a teacher who acquaints them with a course unit and demands that they study it in the same way as a student is expected to. This also means that the trainees have to pass the prescribed examinations. Their assignments are discussed and evaluated with the teacher, who will dwell upon typical mistakes and the best ways of dealing with them. Then the future teachers start practising themselves. They are asked to correct further assignments of the same course unit, but still under supervision of their trainees increase the number of course units they are able to correct.

Part-time teachers and often full-time teachers work at home. A correspondence school may, therefore, employ hundreds of teachers without providing offices. The teachers need not live near the correspondence school, as contacts between them and their school can be secured by mail. At a correspondence school in Paris the teachers are obliged to be present once a week to deliver the correct assignments and to obtain new ones. This gives the teachers an opportunity to meet their colleagues and to discuss their experiences.

Objections are often raised against the depersonalizing of the teacher-student relationship in distance education. Teachers of correspondence schools, however, like to stress that they devote much more time to each individual student than could possibly be the case in the classroom. Quite often this leads, they say, to sustained personal relationships which result in distant students sending postcards from their vacations or announcements of engagements, weddings and births. When Hamburg was deluged by a big flood, a correspondence school there received many letters expressing concern for the well-being of their teachers.

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Teaching and Learning Distance Education

There were expressions of interest in a professional qualification for distance educators at the Fourth Biennial Forum of the Australian and South Pacific External Studies Association. The South Australian College of Advanced Education made the first move and proposed a Graduate Diploma in Distance Education which the Forum endorsed. This was subsequently developed by the College and submitted to its local accrediting authority in April 1981. The course enrolled its first students in February 1983.

It is probably helpful to put the cart before the horse for a moment. The focus here is on the development process, but some introduction to the product will provide a point of reference in the following discussion.

Description of the graduate diploma

The course is the equivalent of one year of full-time study. It is only available externally and is normally taken part-time over three years. This is acknowledged in the course structure which consists of three year-long units, comprising between them some eight discrete modules. The modules where initially conceived and taught as separate units and were combined into their present form to accommodate changes to the College's academic calendar. The annual units and their modular components are:

Development and Design in Distance Education, incorporating

Introduction to Distance Education

Programme Development in Distance Education

Instrumental Design in Distance Education

Technology and Student Support in distance Education, incorporating

Communication Technology in Distance Education

Administration of Distance Education

Student Support in Distance Education

Evaluation and Project in Distance Education, incorporating

Evaluation in Distance Education

Distance Education Project

The final modular component is double-weighted, in that expectations of students are twice those which apply in each other module and it is normally taken over two-thirds of the final year of the course. Each of these modules will be discussed separately, as they were designed and developed, but first some attention will be given to more general issues concerning the steps taken in developing the programme which, from an unsteady beginning, has enjoyed considerable success. Part of the purpose here is to chart that unsteady beginning. This is in keeping with the strongly held view of the small group who were responsible for the Graduate Diploma that the experience of distance educators should be documented and shared.

The Core Team

The term 'core team' had no status within SACAE and was a matter of self-designation. Although many others were involved in preparation of the Graduate Diploma course, it was always the case that a small group took responsibility for managing the process, determining not only what would happen but how their purposes would be met, and arguing for their standards with others they persuaded to work with them. Despite a change in membership and the absence of one member on leave for several months, the ore maintained their control over the course development process throughout. The members of this group were initially Gray Willmott, Rosemary Luke, Ian Mitchell and the present author. Anne Forster subsequently joined the team.

Willmott and the author had enjoyed a close professional relationship since 1975 as the two lectures in curriculum studies at the City Campus of the College. Their educational perspectives were very similar, to the point where either worked easily with course materials developed by the other. They joined the distance education group, having been responsible for a Graduate Diploma in Curriculum Development which was largely taught by working with teachers *in situ* as they undertook various practical projects. Both lectures had considerable experience in producing external teaching materials with a strong applied focus, and drew heavily on adult learning theories, and contemporary British approaches to curriculum, theory, their work. Willmott was the first Coordinator of the distance education programme and assumed major responsibility for it, both academically and administrately. He felt the College in mid-1984 to take up a senior administrative position within another institution; the present author was appointed Head: External Studies within SACAE in August of the same year, but continued to work in the team until the course materials were completed early in 1985.

Rosemary Luke entered the programme on a short-term research contract, having previously lectured in English and librarianship. Her early responsibilities included the compilation and authorship of an annotated bibliography on distance education. Although intended to assist course planning, this was eventually distributed to students as part of the first set of course materials. Luke quickly acquired a comprehensive knowledge of current and available sources on distance education and assumed the role of editor within the group.

Her incisiveness and authority on matters of presentation and style were accepted, and she was given final editorial authority over all written contributions to the course. Over her own objections, Luke was pressed into both writing course materials and teaching in the programme and was appointed to a lectureship in distance education in 1984. At the end of 1985 she left the College to become a teacher librarian.

Most of the team were newcomers to the distance education fraternity in Australia. Ian Mitchell provided the link with the personalities and practices of those we came to see as our colleagues. As Head of External Studies in one of the colleges subsequently amalgamated as SACAE, he had initiated the proposal for a distance education course and participated in the planning process since 1979. His knowledge of the field was drawn both from an extensive range of personal contacts and several years as the foundation and executive editor of *Distance Education*. Although involved in the writing process, Mitchell moved quickly into organizing the teaching of the course and worked closely with tutors drawn from outside the core team. He is now the Course Coordinator of the programme.

During early 1984 Rosemary Luke was on leave, and Anne Forster was appointed as the first Lecturer in Distance Education within the College. Her background included research at the Institute of Educational Technology at the Open University of the United Kingdom and involvement in external programmes in the New South Wales Department of Technical and Further Education, and at the Royal Melbourne Institute of Technology. Following Willmott's departure, Forster exercised a shaping influence in the philosophy of the course team, drawing both on her formal studies in evaluation and on a passionate commitment to the liberating power of external study for students. In late 1984 she became Course Coordinator, holding the position until the end of 1985 when she moved to Canada.

The course team process

In the planning which preceded accreditation it was agreed that the Graduate Diploma would be produced using a course team approach. Two things need to be said about this decision: first, it marked a significant shift in practice for SACAE, in that hitherto most external materials were prepared by individual academics, working alone; second, the group was initially conceived of as being quite large, involving all who would make a contribution to a given unit, including personnel from outside the College.

The group process prevailed, but it tended to be dominated by the personalities and commitments of the core team. Planning for the first unit began with a larger group which fragmented after the firs one or two meetings. The core team quickly came to reject the notion of drawing on a wide range of expertise across and outside the College and preferred to make their own way, consulting with others over quite specific contributions which were then incorporated into the materials by members of the core.

There was a number of reasons for this. First, the core argued that all those in the courses team should accept a collective responsibility for the course. Some who had expressed initial interest did not share the commitment or academic orientation of those who became the core and were not prepared to assume the responsibility being offered.

Second, both Willmott and the present author rejected conventional approaches to instructional design and asserted their views from the earliest meetings. This may well have caused those with different views to lose interest in the proposed course. The particular arguments will be discussed later.

Third, Willmott had a very firm view of the quality of course content he wished to achieve and was determined that the course materials should be both attractive and accessible to students. Those who became members of the core shared

Willmott's perspective and were prepared to ensure that his view of the quality of the proposed course prevailed.

Fourth, dissatisfaction with the first contributions to the materials produced under contract reinforced the growing view of core members that quality would come from exercising much greater group control over the drafting of course materials than contracting allowed. Perhaps too much had been expected of contract authors working in isolation. This further constrained participation in the group working on the award.

Fifth, the actual drafting process adopted under the notion of group responsibility was intimidating, particularly as participants had little or no experience of the elements of peer appraisal it involved. This may have simply been too threatening for some. While the core team came to value and even enjoy the group review process, it was stressful for those who made early contributions. Despite attempts to handle the review of materials in a sensitive manner, it was simply the case that the core were using a process they had adjusted to over time and which, for others, was more direct and critical than they may have expected. Further, through their shared experience core team members had reinforced personal friendships and the normative commitments they had to the programme. Critical exchanges were less likely to threaten them as individuals.

The stress for newcomers to the review process was exacerbated by the speed at which the core team worked. Consciousness of limited time was ever present, and with experience the group became skilled at collective editing under pressure, often working and making shared decisions at a rate which others, new to the group, could not match and found disconcerting. In part, of course, the core team had developed shared understandings and communication short-cuts which made their work both more efficient and less accessible to an outsider. In retrospect, this seems a critical component of the kind of creative process under study.

The notion of collective responsibility involved an understanding that decisions about the programme would be group-based. Further, the team would all be designers, authors, editors, transformers, teachers and administrators of the course. Two comments are necessary here. First, within this collective model some members had special responsibilities, for example, Luke acted as a team member and then subsequently undertook final editing responsibility. Similarly, the course coordinator was officially responsible within the College structure for administration of the course and often had to take decisions with minimal consultation, although these were rarely contested because of the shared perspectives of the group. The Coordinator also chaired meetings and was expected to exercise some leadership within the team. Second, the roles fused over time. Members became adept at incorporating design and transformation considerations into their own writing and in the group review of draft material.

The writing and review process involved the following steps:

1 a team would be gathered to prepare and individual unit;

2 one member would assume responsibility for managing the meetings, for example, convening the group, arranging photocopying, etc.;

3 there would be an attempt to take decisions on the structure and general approach of the unit;

4 individuals would nominate for (or be pressured into) writing tasks;

5 at subsequent meetings the group would review and comment on drafted materials (and this was frequently done at first sighting);

6 the writer would rewrite the materials in the light of comments made, or another team member would take over the redrafting;

7 the materials as improved would be subjected to a further review, although sometimes at this point they were rejected;

8 there would be a further tight edit undertaken outside the group and, depending on available time, the manuscript would be either bought back to the group for a final review or sent straight for typesetting.

From what has been said above, and because of its nature, the process generated a degree of conflict, although less than might have been expected because of the cohesiveness in the core team. The judgment of those involved was that the approach adopted was successful on at least two other counts: the course materials produced were very well received and the process was a most powerful professional development exercise.

There were drawbacks, however. Conflict and the difficulties associated with new members have been mentioned. Perhaps the most persistent was fatigue, the product of too much to do, too little time to do it, and the knowledge that with the completion of every unit it had to be taught as the next cycle of development began. On two occasions, when preparing the *Administration and Student Support* units, core members were almost too tired to function properly yet were driven by timeliness which could not be exceeded. Considerable time was wasted in each instance as the team sought, without success, for a fresh approach to structuring the new unit.

Part of the trouble was that staff were over committed. At SACAE staff workloads are based on students taught, and no allowance is made for the development of teaching materials. Such overload may be inevitable in periods of limited resources, particularly if one accepts that people with the necessary energy or enthusiasm for development projects are likely not to be underemployed when new ventures are proposed.

The fatigue problem was most evident when the core team faced the last major undertaking, preparation of the unit *Student Techniques in Distance Education*. There was no real agreement on what we should attempt to cover and a total lack of ideas for some conceptual framework. The group faced a real tension between our theoretical perspective and confidence in our students and the weariness and sense that we just could not do it all again. The resolution of this dilemma is discussed later.

The relationship between the course team process and the membership of the core group was very close. Because of this, change was to be expected when its membership altered. Comment has already been made on the difficulties facing new members of the course team. The hegemony of the core group was such that newcomers tended to adapt to the existing process or be bypassed by it. On one occasion at least 'outsiders' joined together in a *de facto* sub-group in an attempt to maintain a degree of control over their intellectual product, and so manage their contribution to the course development process.

Furthermore, there was a discernible shift in emphasis when Anne Forster replaced Gary Willmott in 1984. Forster brought a new perspective to the award and was a significant influence on the rest of the group. Her specific contributions included the advocacy of a much stronger and more applied focus on evaluation within the course, both as content and process, and a deep personal commitment to supporting students towards the personal liberation and goals realization distance education affords. The team would have contended that these were both major emphases in the award from the beginning, but this would have reckoned without Forster's commitment and advocacy. She moved team from an intellectual commitment to distance education and a preoccupation with developing a course which would be favorably received towards better, practical and interactive distance teaching. That she did so, and maintained the close ties of friendship in the group, further underscores her considerable personal and professional strengths.

If one may be permitted a generalization which both oversimplifies individual contributions and reveals a major truth about he course team process, Willmott and King provided the focus and determination which were necessary to get the Graduate Diploma up and running, while Forster and Luke modelled how we should work with our students.

Ian Mitchell's role was rather different. He was the one member of the group who had any standing or was even known in the distance education community when the course was mooted, and we relied on his knowledge and extensive personal connections. It was very much in keeping with his personality and commitments to the field that he both accepted and supported others shaping the course; indeed, his commitment to delivery of the prepared units made the continuing development process possible. Mitchell understood that the rest of the team did not know as much about distance education as might have been expected of them, given the tasks they were undertaking. By gently seeking to extend the boundaries of what was being addressed, in particular in relation to the academic and research expectations we had of students, and avoiding obtrusive reference to mistakes being made, he both influenced and gave licences to others who helped in bringing his initial conception to reality.

Finally, there was a serious commitment on the part of the core group to involving students in the course development process. This was never realized to the level of our aspirations, but steps were taken in the right direction. First, the course planning process involved serious consideration of feedback from students on a unit-by-nit basis. It was possible in some instances to address a specific point of concern, such as assignment work, in the subsequent unit. This process was largely reactive, although the team actively sought student comment. For example, a telephone conference was run in the third unit and staff met with almost half of the first cohort of students at the ASPESA Forum at Toowoomba in 1983. Second, contributions to content were sought from students who were experienced practitioners, for instance, one student was interviewed as part of a group of expert practicing instructional designers. Third, there were student representatives on the Planning Committee of the award throughout, who acted as sounding boards for course development suggestions. Fourth, a comprehensive unit monitoring instrument was incorporated into the materials for the *Evaluation* unit, which afforded very specific feedback thereon.

These steps notwithstanding, the core team wished to share the development process in some more substantial manner. Considerable scope given to students to pursue their own professional interests through applied assignment work and a high degree of interactive sharing of experience were created in the *Student Support* unit by using part of the course development process as content, and by allowing students to determine their own purposes for the unit and achieve this through one-to-one dialogue with their tutors. This is described in more detail below.

Both prior to accreditation and in the early weeks of planing the *Introduction to Distance Education* unit, decisions were taken which affected the whole award. In retrospect it is difficult to explain some of them. Often quite pragmatic arguments prevailed, yet the decisions were consistent with the educational stance of the course team members. This may be explained in part by the sometimes unspoken but nonetheless shared understandings we had about what the group was trying to achieve.

The three most important determinants of the decisions taken were: the political judgment that an in-service rather than pre-service course would receive widest support in the field; a view of our likely clientele, informed by a perspective on adult learners; and a commitment to producing course materials which were of very high quality. The last of these was very much a product of the group's desire for legitimacy; we shared the view, that a potentially critical professional community would determine the success of the award very much on the basis of the quality of the first set of teaching materials produced. Our collected fear was the judgment that the College had taken upon itself the task of providing in-service for the field and then failed to match the quality of course materials emanating from other institutions.

Three is a tension between these three shaping elements and the group was very conscious of this at the time, for instance, the potential conflict between our preoccupation with the course materials and the commitment to students shaping their own study goals through the programme. The tension was not resolved. Our stance was that curriculum development necessarily involves an accommodation of the ideal to the practical, that the quest for perfect solutions to developmental problems is misconceived, and that our approach should be as defensible as possible.

Equally there were positive relationships between the three areas. For example, in considering potential students, it appeared likely that enrollees would bring very different levels of sophistication as distance educators to the programme. This was consonant with our view of an in-service course providing opportunities for students to meet a range of professional needs of their own determination. Further, it related to design decisions about the course materials, including the needs to provide alternative study pathways and responsiveness to students' proposals to vary aspects of their programme. Thus the major determinants of design decisions existed in a dynamic tension, reflecting the need to marry practical and educational considerations without conceding some overall coherence and defensibility.

Some of the decision taken were:

1 *in relation to the quality of materials*

a materials would be print-based, typeset, and packaged in coordinated set of purpose designed loose-leaf binders;

b each modular unit would be structured differently, to demonstrate a range of presentational, methodological and assessment techniques;

c the course materials would be conceived as a set of professional resources, to be retained by the student, and embodying exercises and models which could be applied in a variety of distance education settings;

d the print materials would be complemented with a range of non-print media; and

e materials would be visually attractive, accessible to readers, and provide a production standard within the field;

2 *in relation to perceptions of students*

a students would be distance education practitioners with a diversity of special interests, in fields like teaching, administration, graphic art, instructional design;

b students would reflect the range of distance education applications, *e.g.*, schools of the air, primary and secondary correspondence education, universities and colleges, technical and further educations;

c students would have very different levels of understanding skills in distance education;

d students as experienced practitioners would wish to be valued, have their expertise acknowledged, and be trusted to exercise autonomy and professional responsibility in relation to their own study programmes;

e traditional power relations between staff and students should be broken down as much as possible;

f each student should be expected to develop professionally through the programme and, while no status or exemption would be granted, could negotiate study outside that provided in the course materials, or pursue different paths within them;

g students would be encouraged to contribute to the course materials; and h attempts would be made to engage with students beyond conventional tutor-student relationship, for example, in organizing conference participation, assisting with publications, and encouraging open dialogue with students as professional equals;

3 *in relation to the in-service nature of the course:*

a the course materials should provide both flexibility and support such that students could pursue interests at levels commensurate with their professional experience;

b the experience of practitioners at all educational levels should be valued and acknowledged within the course;

c the course would be available only to practitioners;

d all practitioners would be exposed to the experience of being an external student through the course;

e students would be encouraged to undertake applied assignments within their own professional contexts;

f students would not be required to attend on-campus at any point in the programme or in any other way cut across their vocational and personal commitments beyond the necessary allocation of time and energy demanded by their chosen study programme;

g assessment requirements would be varied to meet the needs, interests and previous experience of individual students; and

h the course would provide opportunities for students to clarify their personal learning goals and reflect on their progress towards achieving them.

Development of the modules

There were three notable features of the development of this unit: first, the course team was conscious that many of the decisions they were taking related not only to the unit, but to the whole programme; second, the process of course team activity for the programme was established through the development of the first unit; and third, the notion of contracting authors to prepare unit materials, which had been strongly argued for during accreditation, broke down in practice.

Much of the course team work for the first unit was also about planning for the Graduate Diploma as a whole. A number of the design decisions discussed above were rested immediately. For instance, having determined that the course would be prepared for people currently employed as distance education practitioners, our conception of the range of professional activities which might be covered in the course was challenged. Would we, for example, accept public radio broadcasters or tutors based on remote cattle stations as students? Conversely, additional commitments were entered into which locked the course team into particular approaches for the rest of the programme. For example, the decision to package course materials in a series of four specially designed ring-binders involved graphic art, structural and purchasing considerations to cover a three-year period.

The need to be conscious of the entire process of development was a source of chronic stress. Despite the range of decisions already made, members had considerable uncertainity about the approach and likely content of most of the proposed modules. It is not going too far to say that the team commenced the development process for almost every unit with no clear notion of what they intended to produce. This was offset by a confidence, at least on the part of Willmott and King, that it was all manageable. this may have been unduly arrogant, but their stance was essentially that the Graduate Diploma was not more than another curriculum development exercise, and if specialist expertise were required, it could and would be found. What was not foreseen was how quickly the contracting and brokering processes for obtaining course content foreshadowed during accreditation would break down.

The group development process was established at this point. The personnel, the ways of working, the roles individuals played within the group, were all being sorted through with the knowledge that we would be doing these things for some time together. What should be noted is that there was a political as well as an educational dimension to the decision to proceed using a course team. The educational argument was centrally concerned with staff development and the coherence which could be attained through collective endeavour. The political dimension, and 'political' is used here in a very broad sense, reflected a concern by the dominant group to protect their own view of the standards and course orientation necessary within the award. The collectivity allowed the core group to get all contributions and propose amendments to, or even reject, material from individual authors about which they had reservations. The group's legitimacy came from educational arguments and notions of participatory democracy; in fact, it was an oligarchy which drew upon others only on its own terms. The members of the core were prepared to be judged on the quality of their products and to triumph or be damned.

As indicated earlier, there was some reinforcement for the concentration of control in the hands of core team by the early breakdown of the proposed contracting system for producing materials. The most serious criticism was that the material presented was heavily didactic and did not fit at all well with the commitments made to respecting the experience and expertise of students. Our view was that the students should be able to locate themselves personally and professionally within the course through the first unit, and be assisted to develop their own strategies for using the Graduate Diploma to meet their own legitimate needs. As a result, a new section was planned, the 'Autobiography of a Distance Learner', which came to comprise the first third of the module. This provided a series of structured activities to assist students to reflect on their personal and professional circumstances, reasons for taking the course, learning styles, vocational goals and strategies they intended to adopt for achieving success – however they defined it – throughout the programme.

The course team quickly realized that the time available for the development of each unit module did not allow for such reworking of proposed content. Further, there were some aspects of the proposed course on which they had a considerable agreement and about which they would rather take on additional workload than compromise. An important dimensions of this understanding was the recognition that agreement on process, on the approach to be taken in the module, was more important than being clear about the content.

Programme development in distance education

Willmott and King undertook the drafting of the module, as other course team members turned their attention to teaching *Introduction to Distance Education*. The result was their attempt to apply the work they had been doing in curriculum studies to distance education, and in some ways it is the most conventional section of the Graduate Diploma programme. This is particularly so in relation to its structure and presentation.

The content was more interesting and constituted something of an assault on the field. It drew on a series of five propositions which have been discussed elsewhere and can be restated in the following manner:

1 There is no coherent general theory or broad paradigm of programme development in distance education. The field needs to develop conceptual schemes for drawing together its fragmented literature and guiding research and practice.

2 The literature on programme development in distance education draws upon the limiting traditions of instructional design and educational technology. The field would be better served in this regard by a curriculum theory which embraces a wider range of concerns and treats them as problematic.

3 Programme development in distance education is

characterized by a series of myths and untested assumptions which most analyses fails to acknowledge and examine. There are important questions about the legitimation and justification of distance education which should be of concern to programme developers.

4 Existing analyses of programme development in distance education fail to acknowledge the significance of post-implementation procedures characteristic of successful innovation.

5 To a large degree the literature on course design in distance education is either unknown or ignored by practitioners, probably because it fails to recognize the realities they face.

Using the propositions as points of departure, the authors proposed a conceptual framework as one possible way of making explicit the critical tasks, problems and relationships which exist in programme development in distance education. Its rationale will not he rehearsed here.

The conceptual framework provided the structural basis for the module. In retrospect the diagrammatic representation suggested a simplicity and linearity of approach which might better have been avoided, although the text stressed the complexity of issues, their diverse interrelationships, and the problematic nature of course development decisions.

Two comments should be made the application of this model to development of the Graduate Diploma. First, it was very much a reflection of the kind of deliberations involved in preparing the first development process. Secondly, the consideration of problems and generation strategies for dealing with them at no stage conformed to the sequential scenario offered in the model. Rather, decisions were taken in the light of a range of concerns which frequently cut across a number of the identified problem areas.

Instructional design in distance education

Because of the theoretical stance outlined above, the course team did not want unit on instructional design. It was included in the award at the insistence of the Accreditation Committee. Initially nobody wanted to draft the materials. In the attempt to find solutions to our own discomfort, some quite bold design decisions were taken. These also addressed other issues.

For the first time we were confronted with the certain knowledge that some part of our clientele would have considerable expertise in the substantiative area of the module and it would be necessary to accommodate hugely different levels of sophistication between students. Further, the team were strongly of the view that any approach to designing distance education which did not have a focus on the preparation of print materials ignored the realities of the field. This tool us well outside conventional instructional design approaches but was in strong accord with the transformational principles of MacDonald-Ross and Waller which had assumed considerable influence in our thinking about the course.

The design strategy adopted involved the preparation of three discrete sections. The first was intended for students who sought a good, standard introduction to instructional design or those with some experience of the field who wished to pursue an interest in the area. The section had two distinct strands to meet these different needs. The first strand was twenty-page guide to an introductory text. the second comprised a series of resource papers and readings designed to extend students' analyses of key debates and alternative view points about aspects of instructional design. The second section looked at the way instructional design was undertaken and considered by five distance education practitioners. It consisted of audio-taped interviews with the five, questions on each, tape transcriptions and a general commentary on the interviews. 'Practising Instructional Design in Print' was the third section and covered planning, writing, transformation, review and editing, binding, packaging and assembly of print materials. It was print-based, with a tape-slide presentation and a display of sample print-based materials prepared by individual practitioners which demonstrated a range of cheap, non-technical strategies requiring little professional expertise.

Students were given the option of doing specified assignments from any two of the sections or negotiating a single assessment on any matter of interest to them generally relevant to the area. Within the specified assignments there were both opportunity for directly applied study and considerable difference in the level of sophistication required, although all assignments were equally weighted.

The materials responded to the diverse experience of students of providing quite separate study pathways through the module; thus individuals could complete the requirements by studying quite difference things, and by rewarding accomplishment at the student's own self-nominated level of expertise. These were significant departures from existing external practices at SACAE.

This module also marked the end of attempts to contract authors from outside the College. The problems encountered might have been predicted: failure to meet time-lines, incompatibility of what was provided with the orientation of the in-College course team members, and obstacles to participation by the external author created by his own institution. The decision not to use the contracted materials created substantial problem for the team, all of whom found themselves unexpectedly pressed into designing and drafting sections of the course.

In part the burden was one of the team's own creation.The decision to contract authors had been taken before the core team had emerged and asserted their control over the programme. It was very much a matter of unwillingness to compromise with their own standards. The delays in submission also enabled the core to consider strategies for dealing with the diversity of students' experiences in the area. The failure of the contracting process had two consequences: first, the core was left to develop the rest of the programme, and second, it could no longer avoid more conscious planning of the modules before drafting commenced.

Communication technology in distance education

This module is remarkable for the fact that the course team agreed to present the instructional content on video-tape, which may have been the worst design decision taken. It has been subject to the greatest modification following its initial offering and is in the process of major revision.

The decision to base the module on a three-hour video tape was in keeping with a determination to model a range of delivery techniques, a desire to be innovative, and the availability of a staff member with considerable professional expertise in video production. The core team was very inexperienced with the medium, however, and unaware of the constraints involved. There were communication problems, arising both from the difficulties of the inexperienced trying to control the technically expert and the obstacles to close contact between staff working on different campuses. Further, the cores were unaware of the limited opportunities for editorial revision of a complex video production and the time involved in post-production and tape duplication. In short, the core lost control over the teaching materials. Our difficulties were compounded by the nature of the content (for example, a section on computers rapidly became embarrassingly out-of-date) and overestimating the accessibility of the materials to students (for instance, nearly all students had indicated they had access to a video-recorder, but the team failed to recognize that this did not mean regular or convenient access).

The module was the least satisfactory overall. Core members were reinforced in the belief that if their view of necessary standards were to prevail, control of the process could not be allowed to move outside the group again. One does not need the wisdom of hindsight to be aware of the objections which could be raised to such assertions of the need for control. The stance of the core team was very much that of the need to maintain control to avoid prescription of content and inflexibilities for students. We saw a necessary disjunction between ends and means.

Administration of distance education

This module was largely written before the course team could find and intellectual framework within which to structure to teaching materials. The final product reflects the course team as its most pragmatic, attempting to make virtue out of necessity. The course team was expanded to include other College staff with expertise in educational administration, and various members had views on desirable content. What was missing was any sense of the overall structure or intellectual framework for the module. There is some irony in this, given the determination of the core to exercise greater control over the direction and substance of course components, although the frustration members felt over the development and late delivery of *Communication Technology*, together with a general weariness, was clearly affecting their efficiency. The strategy belatedly adopted was born of desperation. Those wishing to contribute were asked to draft material without considering how their sections might relate to the module overall. This reflected concern that, as time was running out, we should have something on paper, if only to provide an impetus in some other direction.

The components prepared covered: an introduction to administrative theory, the impact of governmental enquiries on distance education, financial management and planing, staff development, the administration of policy development and change, and staff and jab management. The orientation of these discrete section was very different. The problem for the course team was how might be brought together and appropriate study paths created for students with different expertise and interests.

This did not afford an easy solution and, after time, the group opted for the non-solution of passing the problem on to students. The decision was taken to make no attempt to bring the six components into some coherent whole, but to emphasize their separate concerns. Students were invited to select any two areas and to undertake an applied exercise in each. Despite their different emphases, levels of sophistication and demands made on readers, the six sections were treated as equal. This decision was not taken as casually as it might seem. Members recognized that the areas had equal potential to allow students to pursue matters of interest and professional relevance to themselves.

Subsequent evaluation supports the design decisions taken. Students where not bothered by our lack of conceptual clarity. Without wishing to diminish the force of that support, it is worth emphasizing that at best the design of this module was the result of a search for a way to capitalize on educational difficulties.

Evaluation in distance education

This module review heavily on the expertise of other College staff who had not previously worked in the graduate Diploma programme, but was shaped and tightly controlled by the core team. It is more coherent than the section which precede, it and models the view of the *Programme Development* module that evaluation is central to planning and teaching.

A particular strength is the assessment activity, which is embedded in the substance of the module and establishes an unambiguous connection between content and process. Student's reactions to the module are more rigorously sought through an in built monitoring instrument. The centrality of evaluation in course planning is highlighted by a recapitulation of activities undertaken by students in each earlier modules which were evaluative in nature. In essence, there is a movement from the stance of the course thus far, which might be characterized as opening up issues and providing opportunities for students to engage with them both reflecting and in application, to obliging students to identify and come to terms with issues as they arise from their own practice. The difference is one of degree but it is there.

There were excellent contributions from staff outside the core who entered into the course team process wholeheartedly. However, the review process became too daunting and two of the outsiders formed a sub-group, preferring to work on one aspect of the module on their own. Another felt unable to make deletions from an analysis of theories of evaluation which the core felt unbalanced the module through its length. The section was reduced by about one third by the present author, but the original contributor was clearly dismayed by this aspect of the group process.

The assessment activity guides students through the planning of an evaluation exercise in their own field, and is possibly the guest example of teaching by involving students in process offered in the course.

Student support in distance education

This may well be the most satisfactory module in the course. Yet the core team was so over stressed at the point where its development was scheduled that it was decided to produce the *Evaluation* unit first, out of sequence, using the expertise of other staff.

The support module is notable for the following: considerable time was again expended in attempting to find a structure for the materials; the orientation of some of the course team changed markedly during the development process; working on the materials became so engrossing that we had consciously to avoid recommitting the contents of earlier modules; it was during the development process that many of our own ideas and practices were clarified; and finally, the module is so different from where the programme started that it would be better located at the beginning of the Graduate Diploma.

If we had experienced problems in finding a coherent framework for earlier modules, they were as nothing to the difficulties which now confronted the group. The team met for hours over several days in an attempt to find a structural framework and orientation for the module. There were quite different perspectives on what we should be doing. Unfortunately, the view which ultimately prevailed was not clearly understood in the early weeks and for some time members talked at cross purposes.

In introducing the module to the first group of students, we outlined some of the matters which had been important during our discussions:

1 we wanted to reflect adult learning theory in our own teaching to the greatest possible degree;

2 we had a commitment to modelling quite different approaches to written materials with each module;

3 we had been very conscious of the different interests of our students, some of whom worked with children and other with adults, and our concern was to maximize flexibility;

4 we wanted an approach to the materials which allowed us to raise issues without having to treat them in an equally thorough manner; and

5 we wished to avoid the suggestion that the area lent itself easily to some comprehensive theoretical overview.

This suggests a greater clarity than initially existed. At first we had sought an overview and wanted to provide students with a comprehensive and up-to-date perspective on student support. It was also the case that wile team members were not complacent about the degree to which the Graduate Diploma had been responsive to meeting students' perceptions of their own professional needs, most were proud of what had been achieved in the programme and believed its general orientation was sound. Anne Forster challenged us to take a more radical stance, Her view was that members had not yet grappled with their own conceptions of distance education and that this was evident in the way students were regarded. Further, if there was to be any change, this module provided the last opportunity.

The difficulties in finding some direction became so acute that, as Course coordinator, I attempted an assumption clarification exercise which was referred to above under the heading "The Course Team Process". While this made some of our attitudes to the programme more explicit, it did not resolve the block members were experiencing.

Progress was first achieved with a decision on the nature of assessment within the module. The team had been impressed by the work of Barbara Comber, from the College's Graduate Diploma in Reading and Language, who had experimented with assessment based on correspondence with individual students. We agreed students would be asked to establish areas of interests for themselves and to write their tutors four letters during the teaching period about what they were learning and any other related matters. The tutors would write individual responses, and participation in this correspondence would be the sole basis for determining assessment, which would be in the form of a non-graded pass.

Secondly, and soon afterwards, the group began to understand Forster's criticisms. In module 2, *Programme Development*, we had argued against adopting deficit approaches to distance education, for example, by assuming that the course materials were the sole determinants of the learning experience and had there fore to be as near perfect as possible. This was very close to the stance we were taking with the present module. We decided to require students to become more self-directed than earlier modules had encouraged or allowed. Further, we wanted to alter the staff-student relationship to make it more collaborative and exploratory than before. These decisions have been discussed elsewhere. There was still the problem of how to present the various resources we believed students should receive. We adopted the approach taken in relation to assessment for the rest of the module. All the content would be in the form of letters to the general student group from individual staff. There would be no attempt to present comprehensive treatments for various issues, or to relate the letters one to another. In some instances this would happen, but only because the author concerned chose to do so. Contributions would vary in length, focus and approach, depending on the interest of the lecturer concerned.

This was a new stance for the group. Previously all materials had been presented as products of the course team. Members would this time be exposing themselves as individuals. The group review process was still retained however, although the attention given previously to consistency of style and approach no longer applied. The approach liberated members of the course team. There was no attempt to produce the definitive contribution; rather, as individuals we took chances and tried to communicate our interests and enthusiasms to students. Often the substance of a letter from another member of the team would stimulate each of us to write something else. There is little doubt that the team found the module easier to write for than had previously been the case, once this stance was adopted.

Two things happened as a result. First, some of us began to realize the satisfactions of a new approach to distance education. Despite long-standing involvement with external students, the genuinely interactive approach had both intellectual and social rewards which some had not previously found in their distance teaching. Second, without initially realizing the implications of our stance, and as a result of Forster's gentle insistence, the group was reconceiving distance education as support for students who faced a particular set of problems in achieving their personal study goals.

Another aspect of this approach was that it contributed to the breaking down of barriers between staff and students. By writing as individuals rather than a group, a personal dimension was added to the course materials. This brought the core team closer to the collaboration with students as equals it desired and espoused, but had found difficult to achieve. Further, it was a much distant course writing is: 'As your tutor, I have a thorough grasp of the field, which we presenting here in a form you will be able to manage, and with exercises and assignments at points which will reveal to me how well you are mastering and applying the material we are opening up for you.' The message of the materials in this module was closer to: 'we think this item is relevant to the general topic of the module. What do you think? Do you want to propose it any further?' This may overstate each position, but the team felt they were closer to the second stance.

We tried to be honest about our own uncertainties and described the difficulties we had been having in our attempt to establish a conceptual framework, including the reasons for ultimately rejecting it as a legitimate undertaking, including the reasons for ultimately rejecting it as a legitimate undertaking. The assumption clarification exercise had not solved our problem, but it did make clear a number of attitudes team members had to our students and as such seemed potentially useful. It was described in one of the letters, and students were invited to reflect on its possible application in their own situation.

Distance education project

This double-weighted module had been the subject of longest planning in the award, having been the subject of considerable discussion during the accreditation process. The course materials are briefer than for any other section yet they represent the culmination of the educational intentions of the programme.

It had been agreed from the very early stages of course planning that a substantial part of student's work in the Graduate Diploma would be in the form of an applied project in an area of professional interest of their own nomination. The Assessment Committee during accreditation had been concerned about the degree of supervision possible in the distance mode, and the group had agreed to adopt a process of regular reporting to meet such concerns, although at the time the module was prepared our emphasis was more on negotiation and collaboration than supervision.

Three factors in particular shaped the approach taken. First, the evaluation module provided a successful module of structured and supportive guidance through project planning activities. Second, one student had already completed the project under special arrangement, having taken an overload in other modules to complete the course ahead of schedule. In determining the approach to be taken with him, the team had already considered the emphasis to be given to research methodology, the range of approaches which might be acceptable, likely areas for investigation and the methods of assessment. Finally, the very positive response of students to the high degree of interaction with tutors in the *Student Support* module give staff good reason to think that communication and negotiation would be a strength rather than a difficulty in this final course component.

Each student's proposal was vetted by an approvals group, comprising members of the core team, who then assigned a supervisor competent to support the individual in the nominated field. In some instances, where the intended project required specialist expertise outside the scope of members of the course team, and additional external supervisor was nominated. The final project reports were assessed by the supervisor and an external assessor, who reported to the approvals groups. Reports were then forwarded to the students concerned.

Reflections on the development process

In retrospect the rationale for course development in the Graduate Diploma in Distance Education appears to have been based on:

— a concern to improve practice, both through modelling a range of strategies in the delivery of the course and providing opportunities for students to reflect on their practice and attempt modifications of it;

- a rejection of the familiar, rule-based instructional design approach to course development;
- adoption of a curriculum model which identified a broad range of areas which would impact upon course development decisions;
- an acknowledgment that the broader range of issues which thus became a concern in course development should be treated as problematic;
- a determination to apply precepts from adult learning theories in the design and delivery of the course, particularly in the acknowledgment of the expertise of our students; and a commitment to taking decisions which, in the language of Stenhouse, were intelligent, thus making best use of the information available to us at the time.

Course team members were aware of each of these elements during the development process and saw their stance as differing from much of the practice and precept of the field. What was missing, I suspect, was an acknowledgment that one teacher-dominated model had been replaced by another, albeit one which was more liberal and open to student concerns. In this there was a disjunction between the aspirations of the group and the practical consequences of the approach adopted, and members were not initially aware of this. We were unintentionally taking a decisions on the basis of a two limited perspective. The course development strategy altered about two-thirds of the way through the process. Course team members may not have fully appreciated how they were changing the 'curriculum; model they had initially adopted. The change in strategy began during the drafting of the *Evaluation* module, but had a significant impact on the group's practice when, during its delivery to students, tutor-student interaction became more genuinely interactive. This coincided with the development phase for *Student Support,* during which the team came to terms with the altered directions in which they were moving.

The difficulties experienced at that time within the team may have resulted from a basic misunderstanding of what was happening. Those who had been with the awarded longest regarded the changes going proposed as extensions of the stance they had already taken, that is, more 'freedom' would be extended to students. But this was not what was being suggested, and it took some of us several weeks to understand that what was sought was a new basis for legitimating the course development decisions we were taking.

Thus far the decisions were legitimated not by recourse to rules of produce, as in the instructional design approach, but by a view of what constituted appropriate behaviour for tertiary teaching staff, which affords a more comprehensive, subtle and sophisticated basis for judgment. Nonetheless, whatever its refinement, the curriculum approach still establishes what will count as valuable knowledge and appropriate ways of acquiring it within the constraints of the expertise of the academic staff involved.

What Anne Forster was asking us to contemplate, and what the rest of us gradually came to understand and value, was that if you believe that the knowledge of the field rests with the experienced practitioners, then determining what is important to study cannot be dissociated from practitioners and the context in which practice is displayed. This becomes a real problem when designing a course for practitioners in diverse fields and with a range of professional interests. Practice is difficult to talk about without contextual knowledge and 'thick' description. Understanding comes from the meanings found in the practice of a mature and experienced professionals when comprehensively described and subjected to informed reflection. It does not easily lend itself to the establishment of commonalities and prescriptions which are inter-contextual.

The test of a course like the Graduate Diploma must be the extend to which it endorses this approach to understanding through its own practice, while continuing to serve the other purposes for which it is also established, for example, certification of achievement. As such, decisions which address different ends must not become simple compromise. Our stance changed, the course team relinquished a considerable part of its control of what and how students should learn. The team determined to use its expertise to negotiate with and support students as they sought to find meaning in their own professional actions or in the institutional practice with which they were familiar. In the *Student Support* and *Distance Education Project* modules this new goal was achieved to a significant degree.

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Computer Education—At a Distance

This chapter is concerned with two home-computing issues: the kinds of problems and difficulties that people have when they are learning to use computers by means of distance-teaching materials, and the design of instruction for learners in this position. These two issues are intimately connected: in order to design effective teaching materials students can use on their own, it is essential to find out about the kinds of problems students have in learning about computers and the kinds of errors they make. Problems to do with learning to use the computer and computer application are the next hurdle after the problem of gaining access to the computer itself has been solved.

There are now research findings in two important areas related to student computing. Firstly there are studies of learning to use computer applications in commercial environments, and on designing self-instructional training materials for these applications. Many of the same issues arise in producing distance-education materials for teaching practical computing as in designing self-instructional materials; in both cases the learner is almost completely reliant on the packaged teaching material. This material, therefore, has a crucial role and will affect the ease with which the student is able to learn. Secondly there is research on learning to program, including a study of learners using OU instructional materials carried out by one of the authors. The studies on wordprocessing and learning programming at a distance are both important for informing the design of instructional material for carrying out home-computer-related activities at a distance. The remainder of this chapter will draw on these areas, and on past and current practice in instructional design for practical home-computing work to consider issues of learnability and instructional design.

Learning to use wordprocessors and text editors

Several studies have been carried out on learning to use such applications as wordprocessing in commercial environments using self-instructional materials. As with distance teaching, learners are largely on their own in this situation. Carroll and his colleagues have carried out a number of studies in this area starting in the early 1980s, the results of which were used to inform the design of a manual for self-instruction. Carroll explains his approach and goals in his preface:

> One of my professional concerns has been to understand how people acquire competence at using new technology. Our analysis of specific learner problems exposed fundamental flaws in the standard systems approach to instruction and exposed an alternate instructional model, which we call the minimalist model. The essence of the minimalist approach is to obstruct as little as possible the learner's self-initiated efforts to find meaning in the activities of learning.

On the face of it, this approach would also seem to address some of the fundamental issues for students learning to use information technology at a distance. This section will discuss the problems Carroll's learners experienced, before going on to consider his proposed instructional model.

In an early study the participants, who were temporary office staff, learnt one of two text-processing systems. They used self-study manuals for about 12 hours over four half days, and in the testing phase they were asked to type and revise a letter. They were asked to think aloud while they worked and all their interactions with the computer were recorded.

The learners had a lot of difficulties with the task. They often attempted to carry out tasks, such as logging on to the system, without reading the manual, and complained about the amount of material to read and remember. They lacked basic knowledge and had problems with terms such as parameter, queue and pagination. Some of these were problems in misinterpreting words the participants were familiar with but which, in the context of the computer application they were learning to use, now had a different specialised meaning. For example, one of Carroll's learners wondered who the printer was. Another problematic term was 'default', which elsewhere is a legal term.

They did not know what was relevant and so were influenced by superficial connections between what they did or perceived and the problems they were trying to solve. They were also very active in their learning: 'Complementary to learners' lack of knowledge about what is relevant is their ability to go beyond the information given by constructing and elaborating ad hoc interpretations of experiences. In explaining away puzzles, learners can convince themselves that all is well when the odd happenings they have noticed are really evidence of disaster'. For example, one learner was attempting to enter her password when she made a typing mistake which caused the system to stop and await correction. An indicator light marked 'input inhibited' came on. The learner attributed both the delay and light to a heavy workload on the system. Another learner had made an error in issuing a 'file' command and wondered whether her work had been filed. She interpreted the message, *'input mode 1 file'* as meaning that it had.

In another paper such explanations are described as abductive reasoning, where a hypothesis is generated to account for one or more observation. One implication of abduction is that the consequences of errors are explained away and learners do not realise they have made a mistake. They are influenced by superficial resemblances between what they think they need to know and what they see or do. Such abductions are often wrong and are not tested out. Lewis and Mack suggest that such reasoning has value in interpreting future events where there is no alternative to abductive reasoning. Often such complex learning is characterised by incomplete and ambiguous information and if learners are to try to understand the process that might lie behind what they experience then they have to use abductions. What Lewis and Mack are in fact talking about is learners *building up mental models*, which will often be wrong, as they are based on fragmented, ambiguous information. This notion of mental models will be taken up a little further on in the chapter.

One response to problems such as those experienced by the learners Carroll studied is to consider them as the teething problems of introducing new technology into the office for the first time. If this is the case, it should be expected that later systems would benefit from the experience of earlier ones. However, Carroll cities similar problems in learning the later Macintosh-like Lisa system. The Lisa was, at the time, a new user interface with a high-resolution display, a reliance on graphic presentation and applications and was mouse driven. It was highly regarded and highly acclaimed in a review: 'Lisa has made giant steps in saving the user both time and frustration'.

In the study of learners using the Lisa, there were six volunteers drawn from various professions. These participants were not computer professionals but did have a reasonable amount of computer experience and, furthermore, they had experience of different systems. As in the previous study, the participants worked on their own, using the self-9instructional manuals. These included an online tutorial, although not all the participants tried this. Carroll concluded that overall there was a rather lower level of success than expected. The participants did not finish all the tasks suggested and the same types of problems occurred that had been seen in the previous study. They also took far longer than estimated on the instructional materials: for example, the five who tried the online tutorial spent over an hour and three-quarters on it: three times the time estimated by Apple. One complaint made by all the participants was that the tutorial placed them in too passive a role.

These participants said that they were going to read the manual carefully before doing anything - but none of them maintained this strategy for long; instead, they started to try out activities on the computer. When they did read they had trouble finding what they were looking for in the manuals and in co-ordinating the display with what they were reading in their books.

Designing minimalist instruction for teaching word processing

The learners in these studies can be viewed as being active in their learning, making use of their prior knowledge, and having great difficulty in recovering from errors. The problems experienced by the learners in these studies led to a critical analysis of the design of the self-instructional materials.

The style of the self-instructional material the participants had used throughout the studies was very structured. The design followed a standard systems approach which involves hierarchical decomposition of learning objectives. However, Carroll argues that learners have problems because such materials do not relate to their own goals, and because learners are very active in the learning process. He argues that the systems approach does not work and describes how

Systematic drill and practice materials present learners with a motivational double bind with respect to meaningful interaction. If they succeed at following the steps..the success is hollow. They have little control over the situation and cannot feel seriously responsible for the outcomes. However if they eschew the prescribed path - for example, correcting a real typo - they are likely to become snarled in a tangle of errors, which the system and training do not anticipate and recovery from which they do not support. The learner will fail in some sense no matter what the choice.

On this basis, the idea of minimalist instruction was developed, which aims to avoid these problems, first, by allowing learners to start immediately on meaningfully realistic tasks; second, by reducing the amount of reading and other passive activity in training; and, third, by helping to make errors and error recovery less problematic and more pedagogically productive.

The minimal instruction approach was first tried out by producing a set of cards which replaced the self-instruction manual and which adopted a 'guided exploration' approach. These were tried out with a group of learners. Although the cards worked well, and this group did better than a group using the standard training manual, it did not ameliorate all of the standard problems. In particular, the learners wanted a more traditionally structured manual, and so a self-instructional manual was designed, based on the minimalist model. It attempted to have topics of interest to the learners - for example, chapters had headings such as 'Typing Something' – and learners were able to start learning to use the system.

Two experiments carried out on the use of the 'minimal manual' indicated that it was substantially and reliably better than the commercial self-instruction manual. An important concern to those designing distance or self-teaching material for students using computers is the best way of carrying out the design process itself. Interestingly, the design process for the minimalist manual described by Carroll is similar to the standard process adopted for OU teaching material which is described in the next section. It is an interactive design process where the material is designed, empirically evaluated and then redesigned. In particular, producing the minimal manual involved three states of different empirical testing. Pilot testing was incorporated into a design-analysis stage which drew on knowledge of how users went about tasks and their typical errors. Following this, particular design elements were empirically tested in qualitative detail by observing typical users at work with the manual. The final version of the manual was tested in the two experiments described earlier.

In earlier chapters we saw that the very structured approach to distance learning offered by the 'industrial model', of which the OU is an example, was criticised for being too prescriptive and didactic and for promoting a one-way model of teaching, where the students has little opportunity to engage in a real dialogue. Such criticism is consistent with Carrolls's data where learners felt they were cast in too passive a role. one alternative to this kind of approach for practical work is a more student-centred 'discovery' model. Such an approach has often been used with children learning the language LOGO. Some of the claims made for LOGO are that it can teach people to reason, problem solve and plan, or rather, help people to learn these things for themselves. The best exposition of this LOGO philosophy is given by Papert in his book *Mindstorms*, where he says:

> In my vision the child programs the computer, and in doing so, both acquires a sense of mastery over a piece of the most modern and powerful technology and establishes an intimate contact with some of the deepest ideas from science, from mathematics, and from the art of intellectual model building.

This philosophy assumes an open approach to learning where the sequence of concepts learnt will depend largely on the learner, and the judgement of the teacher.

One manual produced to accompany a version of LOGO developed by the OU did adopt such an approach, where the learner is invited to explore and discover LOGO. In line with LOGO philosophy, the manual adopts a style which is rather less structured than many programming instructional manuals. However, a study of adult learners using this booklet showed that some problems arose because it was *not* prescriptive enough. For how long were they supposed to explore? Had they got a 'right' answer? The adult learners in this study found learning LOGO hard and the difficulties they had led to problems with the exploratory 'diagnose your bugs' style of the tutorial manual. Where they have made more than one mistake, and these may interact in a programming language, and their processing models are faulty, students are unlikely, themselves, to diagnose the problems. In this style of teaching, programming is not taught because the learner is supposed to discover it.

Too unstructured an approach can feel very uncomfortable for adults who are not used to working in this way: moreover, in practical work at a distance, it can leave them without sufficient support when things go wrong as, when students explore, things inevitably will! The LOGO curriculum, in attempting not to be prescriptive, failed to meet the needs of the intended audience, and was criticised both for misjudging the audience and for therefore presenting both inappropriate material and for using an inappropriate style. It is interesting that Carroll's learners also found the unstructured style of the guided exploration cards uncomfortable, and asked for a more traditional manual.

To a large extent, the kind of interactive process employed by Carroll *et al.*, is already built into the production cycle of most OU materials. Courses are produced by a course team which will typically include academics, a course administrator, a member of the academic computing service, a television/audio producer, an editor and designer and an educational technologist. Drafts of particular parts of the course are produced and circulated around the members for comment. Typically a unit of course material will undergo three full drafts before it is finalised and handed over to the editor. In addition to this internal commenting, there will be one or more external assessors who will also receive and comment on all the drafts. Depending on the course, it may also undergo formative evaluation, which usually involves a number of students working through the course materials and commenting on them. The stage at which this happens is quite critical: if it is too early, the materials will have gaps and they will not resemble the final product closely enough to be a realistic simulation; if it is too late, then there will be insufficient time to make changes following the feedback.

Designing practical work for trainings teachers to use computers

The formative evaluation process described above is not applied to every course. However, it is particularly important to test out any element of practical work, whether it is a laboratory-style home experiment or the use of a computer, as students will be on their own if and when any problems occur. We know that learners are likely to have difficulties when starting to use computers for the first time, and in developing one set of materials for novice computer users, the course team adopted a particular design process to ensure that the material was as accessible as possible for students. In this case what was being developed was training materials for teachers as part of the 'Microcomputers in Schools' project. The project team responsible for these materials decided that the empirical evaluation process was so important that it should be carried out twice. Before describing the process it is necessary to describe the courses and their design.

The 'Microcomputers in Schools' project produced five stand-alone but linked 'packs' of course materials aimed at teachers, ranging from complete novices to those with some experience of computers. Its background, aims and design process are described in more detail elsewhere by the project director. At the time, the early 1980s, it was clear that there were teachers who were very frightened by the idea of using computers, and the first pack produced was the 'awareness pack' which assumed that the student had no knowledge whatsoever of computers and, moreover, might be very nervous. To help students with the very real problem of getting the computer they were using connected up in order to start, different-coloured and coded labels were provided which could be attached to the leads and their connections.

In the text material, all the practical work was laid out in a three-column format, where the first column gave the keypress required, the second gave a photograph of the screen display that appeared as a result of that action, and the third column provided a commentary. Clearly in this style of very structured instruction it is imperative for the text and the screen photograph to match exactly what was happening on the student's screen. For the courses in the 'Microcomputers in Schools" project, the empirical testing was extensive. External 'critical readers' were employed to comment on the first drafts of materials in addition to the project members. The second draft, which incorporated the feedback from the first, was evaluated by students working through the whole course in detail. Following comments from other team and project members and the evaluation feedback, a third draft was produced. Before this was handed over to the editor, a final round of testing was carried out to ensure that all the steps in the practical work corresponded to the screen photographs and that these, in turn, were an accurate representation. This final round of testing came to be known as 'catastrophe testing'!

This formula proved to be very successful for complete novices, and was also appreciated by students with some experience. It is quite structured, and allows the student relatively little freedom to decide what to do in the practical hands-on material, although in other parts of the course there is much more open-ended work where the student applies what he or she has learnt to his or her own situation and carries out project work.

These two figures illustrate how exploration, and the learner's own goals, can be encompassed within this model: it does not need to be the kind of step-by-step approach criticised by Carroll for leading to passive learning, and which seemed to contain a lot of drill-and-practice.

There was also an attempt to avoid the problems of the step-by-step approach, where students lose the global view and can end up recipe-following with little understanding by including the third 'commentary' column which provides some rationale and an overview.

The three-column style of the activities book, along with the case study and project book which accompanied it, appears to fulfil the same criteria as Carroll's minimalist instruction. Students are quickly in a position where they are engaged in hands-on activities; the guided exploration which happens in some places encourages students to be active and to engage in the activities they want to; and recovery from the errors they make should be supported by the troubleshooting guide supplied in the appendix. As far as keeping the reading down is concerned, the booklets are quite slim with little extra verbiage or repetition and little in the way of overviews and prefaces, etc. In fact, the OU has a built-in disincentive against producing too much reading material because of the high cost of extra print - and the extra study time required of students.

This approach is not completely successful in all cases, however, A study of students carrying out practical work with such an approach, on quite a different course, indicated that, for these students, the problem of learners operating at too low a level (taking a micro-level approach, like the surface-level processing) has not altogether been avoided. The course was analysed as part of a study in which four different curricula for teaching novices to programme were evaluated. Three of these texts guide the student quite closely by structuring the material very carefully, two of which adopted the three-column format discussed above. It would seem that in some cases, however, this style of instruction, although it does provide an overview, may still encourage the learner to adopt an over-dependent attitude towards the text.

The experiment book for one of the courses examined in the study, *Microcomputers for Managers*, adopts a step-by-step 'recipe'-type approach and contains relatively little work of a less structured and open-ended nature. Students instead carry out 'experiments' and are working in assembler, a low-level programming language where it can be quite hard to 'step back' and get a global view. One danger, therefore, is that as the experiments consist of very structured steps, they can be followed and yield the correct answer without a deep understanding of the process being developed. There was some evidence of this happening in the study. It seems that it is important therefore to consider not only how the material is presented but also the domain and the task involved.

The "Microcomputers in Schools' awareness pack was very successful. The same design was followed by the next level of pack – aimed at students with some experience of microcomputers.

Later course have evolved their own particular styles of teaching and methods of instructional design. There is no one design philosophy at the OU to which all course teams adhere, although the course-team model ensures that each course is exposed to considerable comment and feedback during its development. The approach to teaching practical work in courses within the Home Computing Policy varies considerably. However, if they are introducing students to new applications, most include step-by-step guidance plus commentary, although the level of detail and support will vary, as shown in the following examples. It takes students through from the very beginning and even includes a photograph of the keyboard. In this respect it is reminiscent of the detailed hand-holding guidance given to the students of the "Microcomputers in Schools' awareness pack.

In this section students are being introduced to Cosy MAIL – the MAIL facilities for the computer-conferencing system on this course. A Brief overview of the purpose of the exercise is given, followed by numbered instructions for the student to carry out. At the end of the third step there is a commentary. Note that the typography and layout carry quite a lot of information. The numbered steps help to reduce the cognitive overload by allowing the learners to see where they are quickly. Everything that appears on the computer screen is in bold type, and the commentary section is prefaced by its own icon.

The next example is also taken from the same course, but is rather different. Here, the learner has just found out how to select a desktop function by single clicking the mouse, working with GEM desktop program. Next, double clicking is introduced, and here a screen image is given so that the learner can check whether the action has been carried out correctly.

Students with differing amounts of experience will also need a different approach. One approach used in the technology foundation course, where it is reasonable to assume that most students are novices with respect to computing, is to introduce the operating system and the applications through audio-cassettes. This reduces the number of physical items students have in front of them, which can be a real problem. It also means the learner does not have to keep alternating between referring to a book and looking at the screen. The instructions on the audio-tapes were recorded in 'real time', so the student can carry out the instructions whilst listening to the tape although of course there are place where he or she will need to pause the tape in order to try out some activity and then re-start it when finished. Some students have found this way of introducing them to the practical work invaluable. Others have used it in ways that were certainly not anticipated by the course team, *e.g.*, listening to the tapes whilst driving to work! However, once students have worked through the tapes, they are not a good vehicle for reference. Trying to find where particular commands are dealt with on an audio-tape is not easy and, similarly, for students who are not complete beginners, using tapes is not so helpful, as what they need is a quick and easy reference system that reminds them about particular

Another important factor in distance learning and practical work the three column formats may not take fully into account is that learners actively interpret the text and form mental models. This is inevitable and necessary in order for them to learn and assimilate the material they are encountering Carroll's studies provide examples of how learners will seek to be active in their learning even when discouraged from doing so.

In the previous sections, the term 'mental model' has been used to describe how learners represent the system they are learning to use. The idea of learners using such mental models has been around for some time, although different researchers have used different terms. It can probably be traced back to at least 1981 to a statement made by Young:

> "System designers and applied psychologists are increasingly coming to believe that people deal with complex interactive devices by making use of a conceptual model of the device, and that the fostering of this model is an important consideration for the designer. The notion of a user's 'conceptual model' is a rather hazy one, but central to it is the assumption that the user will adopt some more or less definite representation or metaphor which guides his actions and helps him interpret the device's behaviour. Such a model, when appropriate, can be helpful, or perhaps even necessary for dealing with the device, but when inappropriate or inadequate can lead to misconceptions and errors."

This then is the idea of the mental learners use when operating a device. It has also been argued that the system itself should be taught using a similar model. This idea applies throughout learning complex devices or domains, and when teaching about computer systems or applications it is particularly important to consider how they are presented and represented to the learner, especially given that learners will be active in their interpretation. Du Boulay, O'Shea and Monk, for example, argue that a major problem in teaching voices programming is describing the machine the novice is learning to use at the right level – as the novice usually does not know what the machine can be instructed to do or how it does it. They suggest overcoming this problem by basing the teaching on a 'notional machine', which is an idealised model of the computer based on the programming language. The notional machine helps learners by providing a descriptive model which they can use to plan programmes and to interpret the machine's response. As this idea, and similar ones, are usually referred to as 'conceptual models' by other researchers, this is the terminology that will be used here from now on.

Criteria for designing conceptual models for novices

Du Boulay, O'Shea and Monk advocate two principles upon which to base the conceptual model: *simplicity* and *visibility*. One aspect of simplicity is that there should be a set of instructions and commands which is small enough to be learnt readily by a novice. Another example of simplicity is that the language is suited to the task in hand. Syntactic simplicity 'is achieved by ensuring that the rules for writing instructions are uniform, with few special cases to remember, and have well chosen names'.

Visibility means that wherever possible, methods should be provided for the learner to see the workings of the conceptual model in action, for instances the effects of commands. One way of doing this is by means of a commentary, a 'glass box' through which novices can see the workings of the machine. As the area they discuss is programming, it is not surprising that most of the examples of visibility which are given concern highlighting flow of control. Help for novices to decide what state the machine is in is also mentioned, and the importance of choosing names that do not conflict with novices' previous knowledge. In the context of distance education where learners have little support, it is clearly important to consider how to make learning such skills as easy possible.

To help illustrate these ideas, an example of a conceptual model will be discussed which embodies the principles of both simplicity and visibility. The discussion is necessarily rather more technical than previous sections of this chapter, and readers who don't want to follow through the example in detail should miss this section and go on to the last part of the chapter, the conclusions. The conceptual model is for a microcomputer, 'DESMOND'. The conceptual model is essentially provided by the machine itself - it is its own model and has been designed so that its workings, at the appropriate level, are visible. DESMOND is the name given to the microcomputer used as part of two OU study packs: *Inside Microcomputers* and *Learning about Microelectronics,* and was in fact sent out to students as a home experiment kit.

DESMOND can be operated in three different 'modes'. In the first, monitor mode, the user can inspect different memory locations and change the contents. In order to increase the machine's simplicity, there is an attempt to make the workings of each mode easy to understand. In monitor mode, for example, the display is divided into three parts, each giving different information: the first part gives the address of the memory location, and the second and third parts give the contents in two different forms. Arrow keys are used to move backwards and forwards through memory locations.

To fulfil the criterion of visibility, all the circuitry and chips are visible, and devices are grouped together according to their function. The battery box is on the top right. On the top left are various switches and below these are the sensors. Together these make up input devices. The output devices are grouped together on the right. On the right, below the battery box, are five different-coloured lamps; below these are a buzzer and a motor. The keypad has two sections: the left side contains digits from 0 to 9, and the right has two rows of keys, of which the top four are keys for changing *mode,* for example, going into assembly mode where programs can be entered in assembly language, or into run mode by pressing R for running a programme.

A detailed analysis of the design of DESMOND in terms of visibility, simplicity and additional criteria is given by Jones. Here, one further example will help to illustrate the attempts to make the conceptual machine as visible as possible and to help the learner keep track of where he or she is. This is visibility by making the contents of memory locations visible, for example by making it easy to inspect the 'address' of a memory location and its contents. An earlier example was given of how in one mode, monitor, the display shows the address of the location and its contents; in another mode, assembly, we see the programme line, and the two parts of the instructions. In run mode, when programmes are being executed, the contents of different locations are not usually shown, but there is a facility for running a programme step by step and being able to inspect the contents of the relevant memory locations after each step has been executed by the computer. This helps the user to see what changes are happening at each step.

Keypresses are given for most of the experiments in the practical book, except for the final experiments where it is assumed that this level of guidance is not needed. The instructions are given in the three-column format described previously where the first column gives the keypress, the second shows what will appear in the screen and the third gives the commentary.

The criteria for designing conceptual models in use

One important problem with such criteria is that there may not be a clear correspondence between what appears to be good design, according to the principle of simplicity, and how easy such systems are to use in practice. Mayer has carried out empirical work demonstrating the value of conceptual models, but prior to a study carried out by one of the authors, Du Boulay, O'Shea and Monk's criteria had not been empirically tested, although the three examples of systems they give have all been in use.

A further principle for conceptual models is introduced by Jones—the principle of consistency. Consistency is the extent to which the behaviour of various parts of the conceptual machine is related. An example of this would be whether a particular command can be inferred from another. In LOGO, having learnt the *left* instruction, one can reasonably infer that there will be a *right* instruction. This principle applies in environments other than programming and may even be more important in such application in that, if there is consistency, then one application can be used by analogy with another. The Apple Macintosh provides a good illustration of this principle, as it enables users to transfer between applications. For example, when using an unknown piece of software, a user can assume that he or she can take the mouse to one of the headings at the top (many of which stay constant across applications), click to obtain the menu, drag the mouse down to where he or she wants and release to activate the appropriate action. In other words, using a new application is done by analogy with a previously known application. There is also another more general type of consistency, which is whether the conceptual model is always presented in a consistent way. The conceptual model is not solely presented through one channel, such as the instructional text, but through error messages, what appears on the screen, etc. All these should be consistent.

It has recently been argued that the criteria offered by due Boulay, O'Shea and Monk are not sufficient for evaluating conceptual models for novice programmers as they do not give enough emphasis to what happens when novices are learning programming languages. Jones's argument is that, for an analysis which is helpful in designing conceptual models for novices, and which also has some predictive power, it is necessary to combine such criteria with a different approach, which categorises the conceptual model in terms of state, function and procedure. the analysis she advocates combines three criteria for a conceptual model (simplicity, consistency and visibility) with the identification of which of three views of the system (function, state and description) are most prevalent in practice, and this is described next.

Views of the machine

The three different views or descriptions of the system are given briefly below. A full description is given by Jones:

State description This is the state of the machine at any point in time, and will include for example, the values of variables, or in the case of DESMOND, the contents of particular memory locations.

Functional description: A description of the system in terms of the goals of the task and a description of the methods for achieving the goals. The goal could be expressed at various levels of detail. In some languages such a goal might be to 'add 2 numbers', and the method for achieving it would be described in terms of the contents of particular 'registers' or memory locations. In another language the goal might be to sort to unordered sequence of numbers into ascending order and the way to do this might be to use a SORT routine. Some goals might be achieved by a single statement or command, *e.g.*, a LOGO repeat statement has the function of repeating commands.

Procedural description: A description of the machine in terms of the set of operators and their pre-conditions for carrying out a task. In LOGO examples include the commands for moving the turtle or for printing on the screen. In order to have a complete procedural description for drawing a square, the necessary pre-conditions include the position of the turtle on the screen. In a low level language an example is the command for incrementing the contents of a register.

A conceptual model is unlikely to give equal emphasis to these three different views. Which of the three views is emphasised will depend on a number of factors which include the language, the types of examples given, the style of the instruction and the representation used.

There may well be examples for which it is difficult to decide which view is being given. This is not a serious problem: what is important is which aspect is emphasised or highlighted. So, for example, a functional description emphasises the function or role of the code whereas a procedural description gives the steps for carrying it out. This emphasis is important for the novice. The usefulness of the categorization lies in identifying the different kinds of knowledge which are necessary to understand the conceptual model. It provides a way of assessing whether the conceptual model offered gives these different views, or whether it is emphasising only one or two views. For example, a conceptual model offering only a state description will not be helpful, because the steps for carrying out the solution are not fully specified - though listing the intermediate states which presenting a procedural model may be helpful since it gives the learner confirmation that his or her mental model is correct.

For the example considered earlier, DESMOND, it was the functional view which was the weakest. For example, the two main problems for students learning to use DESMOND were identifying the appropriate 'plans' to use, and flow of control. This is consistent with the lack of a functional view of the machine: students were required to use such plans as counting routines or testing the key board, yet such plans were not acquired by most of the students and even the simplest was not given in the DESMOND manual. Instead, the instruction manual gives examples of the plans in the form of short programs but does not give the plan themselves.

The indications, therefore, are that it is important for the novice to have a functional view of the machine, as this will help in developing programming plans. However, in the conceptual model studied it was this view which was often missing. fortunately, such a deficit is not too hard to remedy. Whenever possible, a functional description could be displayed in addition to the state descriptions and procedural descriptions.

In a language such as DESMOND, the best way to give a functional description of the conceptual model is to give the plans. By giving the description of the conceptual model is to give the plans. By giving the learners a functional model, their task would be made less demanding, and their chances of successful learning increased.

In spite of the concern that learners become too dependent on them, it is clear that of the students in the study mentioned above were active in their learning - interpreting the next and making connections. It seems, therefore, that the designer of distance-learning or self-instructional material for the programming novice is faced with a dilemma. The material needs to be structured and much support provided such that the novice can confidently negotiate the material, but it should not lead the novice to place too much problems that will undoubtedly occur, and have faith in his or her ability to do so. However, encouraging (and indeed requiring) students to interpret the text actively means allowing them to make their own mistakes, form misinterpretations and incorrect models. The issue is not about preventing them from doing this, which is neither possible nor desirable, but about how to support them when they have made mistakes.

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Current Crisis in Adult Education

In what ways can we say that the field of endeavour called adult education is in crisis? We can refer initially to the difficulties adult educators have always come up against in maintaining a firm, minimally financed, institutional basis from which to practise their vocations. These difficulties are apparent even within institutions, such as community colleges, where the mandate is, supposedly, entirely given over to adult education. The struggle for a share of resources and legitimation is much more clear-cut for adult education components operating within larger institutional settings. And adult educators working in non-formal community settings, usually without benefit of sanction that comes from affiliation with larger institutions and government departments, are constantly confronted with the need to sustain a modest resource base.

The problems associated with marginal status persist for adult education practitioners even now that mounting public rhetoric is proclaiming the virtues and necessities of continuing education for adults under the rubric of lifelong learning. However, widespread enthusiasm for the notion of lifelong learning in recent years seems to have presented the opportunity for adult education to move from its marginal role in society towards centre stage and, understandably, adult educators have wanted to sieze upon the opportunity. Unfortunately, there is a real danger of adult educators becoming so pleased to be recognized that they will find themselves lending support to the subversion of voluntary lifelong learning in favour of mandatory lifelong schooling. If at this juncture such a prospect seems a little far-fetched, it is evident that an eagerness to consolidate more substantial recognition for the role of adult education has been accompanied by a proclivity to incorporate within the field of practice an increasing array of pedagogical techniques, trappings of a cult of efficiency which harbour the germs of the current crisis in adult education.

While the cult of efficiency is most pronounced in North American adult education practice, the tendency is well untrenched elsewhere. In Britain and other western European countries, formal adult education practice has probably been, on the whole, better informed by philosophical writings and by more clear-cut commitments to social concerns. However, even in these countries, evidence of a clearer understanding of the issues at stake and a tradition of practical social commitment have not countered within adult education practice a growing, taken-for-granted fixation on technique.

Fixation on technique

The cult of efficiency refers to a growing, and seductive, tendency to make more and more areas of human endeavour amenable to measurement and techno-bureaucratic control according to what is invoked as a scientific approach. It elevates technical rationality to a position of undisputed pre-eminence over other forms of human thought and discourse. Although currently very expensive, this is not a new phenomenon. American public school administrators, for example, were extolling the virtues of scientific management principles, as applied in business and industry, in the early 1900s, and a resurgence of faith in the application of scientific principles to public school administration and curriculum development has coincided with each recurrence of general public demand for 'back to basics' and for greater accountability. Until recently, though, adult education, even in the United States, has not been quite so susceptible to the ideological demands of the cult of efficiency.

Why should we be alarmed at the prospect of adult education paying homage to the cult of efficiency after the manner of method-oriented pedagogues who have been able to direct, or misdirect, their techniques on to American public schools? After all, aren't efficiency and the application of technique at the core of prevailing political rhetoric on the need for educational initiatives to help us meet the technological revolution of 'post-industrial society' as we head towards the year 2000? The prospect becomes alarming when we witness aspects of the cult of efficiency intruding into more and more aspects of our everyday lives, as though determined to organize all human activities within scientific guidelines. And yet there is still a prevalent and sadly mistaken tendency in today's society for educators to regard technology as something neutral and to ignore the very subjective practical consequences that accompany its deployment. Even as this chapter is being written, the practical consequences of applying bio-medical techniques to provide surrogate mothers for child bearing are only just beginning to unravel.

On balance, it may well turn out that the creation of life via surrogate motherhood will enrich human experience, but it is clear that the deployment of technique in the case of 'test tube babies' has encroached upon a vital domain of this fundamental creative experience before we have been able to get to grips with its subjectively grounded practical consequences. The provision of surrogate motherhood via the deployment of bio-medical technique is but one of a legion of examples we can cull from contemporary society to confirm that technocratic values are taking precedence over practical (ethical) viewpoints in shaping vital areas of our everyday lives. Martin Heidegger captured the essence of the predicament and the challenge in the following passage:

"Modern technology too is a means to an end. That is why the instrumental conception of technology conditions every attempt to bring man into the right relation to technology. Everything depends on our manipulating technology in the proper manner as a means. We will, as we say,' 'Get' technology 'spiritually in hand'. We will master it. The will to mastery becomes all the more urgent the more technology threatens to slip from human control."

Though the trends and concerns noted in the preceding paragraphs are drawn from a North American context, the technicist obsession they portray can be readily characterized by similar examples in other countries. It is not only in the USA that modern adult education practice has so readily adopted the cult of efficiency. The extent to which adult education practice in Britain, for example, has fallen in with the government's ideologically driven skills training schemes is instructive, particularly in view of the somewhat greater inclination among British adult educators than their American counterparts towards social critique and political analysis.

Among defenders of the terrain encroached upon by inappropriately applied technical schemes is a fraternity of adult educators whose ranks dwindled as so many of their associates, wilfully or unwrittingly, have themselves joined in the endeavour to hoist the ideology of technical competence and technocratic professionalism to a position of undisputed prominence. In this book we will be referring to the works of some of these adult educators who recognize that the vital territory threatened by a cult of efficiency provides sustenance for men and women to exercise a significant degree of autonomy in their day-to-day lives with a minimum of interference and coercion from outside experts and officialdom. The presumption of a relatively autonomous domain, however meagre, in the everyday lives of men and women is surely a prerequisite for any notions of a real participatory democracy and genuine self-directed learning.

These concerns are not highlighted as part of a polemic against technological innovation. But they do represent a deep anxiety at the way so much of adult education has resorted to the ideology of technique in recent times to guide its practice.

The growing tendency towards inappropriate applications of technical, mecha-nistic formats, which will be termed technicism throughout the course of this book, to steer adult education endeavours is what constitutes the current crisis. Such formats commend themselves to us because they convey an impression of being systematic: they impart a sense of certainty and order to educators and learners.

Adult learning situations managed by technical formulations, such as standardized pre-packaged curricula and preconceived needs assessment instruments put together by those who have contrived to become designated as experts tend towards artificiality and detachment from real life everyday experience. Formalized adult education is thus transformed into the technical planning of instruction and literally gets in the way of individual learners' ability to think critically, and to evaluate everyday experience on their own account. Independence, reflective, thought on the part of the individual learner is effectively usurped by the expert designers of technocratic curricula and those who embrace their technicist assumptions. With them at the helm, adult education as an organized system will serve to subvert critical powers of insight and imagination. They steer modern adult education practice away from any real prospects it might have of developing into a genuinely transformative pedagogy for a more just society.

We will deal further with the assumptions and consequences of adult education programmes based on technocratic models later in this chapter. It suffices to note at this point that adult learning situations managed by technical formulations, such as standardized pre-packaged curricula and preconceived needs assessment instruments put together by experts, become distortions—or at best, mere adumbrations—of our everyday experiences. Vital dimensions of these experiences, which cannot be adequately dealt with from the standpoint of a technocratic paradigm, refer us to practical and ethical activities of adulthood. These activities call for thoughtful, critical assessment and are not reducible, simplistically, to a finite series of preordained skills and competences.

The concerns laid out here are not new. Thoughtful adult educators have been troubled for some time by the uncritical acceptance within their field of practice of assumptions, techniques, and stipulations associated with the cult of efficiency. It is over half a century since the much cited American adult educator, Eduard C.Lindeman, wrote in *The Meaning of Adult Education* about the dangers of specialism and preoccupation with method. And three decades have passed since Richard Hoggart, an English adult educator, noted in his eminently readable book, *The Uses of Literacy*, that 'the problem is acute and pressing—how that freedom may be kept in any sense a meaningful thing whilst the processes of centralization and technological development continue'. Hoggart was particularly concerned about 'the division between the technical languages of the experts and the extraordinarily low level of the organs of mass communication'. Yet, despite the classic accounts of Hoggart and Lindeman, and the frequent reference by contemporary adult educators to these two books, the crisis has deepened since their times. The obsession with methodology and technique has become so embedded in adult education practice and research that many practitioners are no longer able to recognize the way it controls and shapes adult learning activities. It does nothing to offset the 'low level of the organs of mass communication'. If anything, a modern practice of adult education steered by technical rationality serves to reinforce the manipulative, controlling effects of popular mass communications rather than unmasking them.

The immediate challenge, evaded by most adult educators preoccupied with a plethora of strategies such as self-paced learning, computer-guided instruction, learning contracts, and competency-based education, lies in determining how to deploy methods and technology as subordinate, supporting optional functions that are not allowed to steer the adult education process. Unhappily, these media themselves are becoming the predominant message of modern adult education practice. An overall orientation characterizing adult education as a fundamentally technocratic endeavour, even in the way it informs us about learning how to learn, remains undisturbed by frequent references to the importance of critical thinking. Critical thinking in adult education, it seems, is either to be relativized so that it does not come into direct confrontation with the predominant ideologies, texts, and authorities of the field or it is reduced, with technocratic abandon, to a series of critical thinking 'skills' or 'competencies'. Either way, the critical edge is lost.

Although a few adult educators have continued to point out, and to resist, the more obvious aspects of the cult of efficiency, the crisis is deepening. Increasingly, an eagerness on the part of many adult educators to be accepted as socially relevant has become intertwined with a belief that most of the major ills of society, as well as individual learning deficiencies, can be ultimately solved by construing the underlying principles of the field in technocratic formats. So as adult educators lay on techniques in the form of learning contracts to direct adults on how to become self-directed learners, for example, we are co-opted by the cult of efficiency and technical rationality. An underlying principle of adult education practice that has to do with the central importance of the learner's past experience and a responsibility to preserve the integrity of voluntary participation is undermined when technique steers, and shapes, the educational process.

Techniques that shape the learning environment are built into a vast array of standardized, systematically designed, learning packages for adult students. Their prescriptive intent is discernible even when they are accompanied by such labels as 'self-directed', 'learner-dirven', and 'self paced'. The practice of applying significant value-laden terms to characterize technocratic curriculum formats is widespread. These are deployed quite promiscuously as a strategy to make extreme rationalization of the curriculum more enticing. And there is no doubt that adult educators are being seduced by exemplars of extreme rationalization such as competency-based learning, and the many skills-based curriculum formats which purport to teach us how to cope and how to live. The latter are proffered under the rubrics of 'coping skills', 'literacy skills', and 'life skills'. The climax of all this will come, presumably, with an immature, somewhat pathetic, faith in the notion that coping and living can be reduced to a definitive number of identifiable skills or competences.

In this context the idea of lifelong learning has become little more than a slogon. And,while slogans do have their usefulness, the term lifelong learning is used excessively as a label to legitimize all manner of adult education programmes. This usually precludes any need to make a critical appraisal of their technocratic and prescriptive content. Lifelong learning thus becomes lifelong training or lifelong schooling in line with technicist ideology. If anything, when deployed to legitimize prescriptive curriculum formats, it now signifies the erosion of the voluntary nature of adult education. It becomes the vehicle from which a technicist ideology further subverts the role of the adult educator in today's society.

When the term lifelong learning is literally plugged into a funding proposal or used as capstone description for a new technical-vocational programme, for example, merely to sell adult education as a product, the adult educators involved in are demonstrating a proclivity for current fads which brings little credit to the field as a whole. No doubt some adult educators sincerely believe that such strategies are necessary to overcome the marginalized nature of adult education as a field of practice. Unhappily, in the process, lifelong learning as a useful guiding principle has become debased currency. It serves entrepreneurial interests that have little in common with the aspirations for adult education in the twentieth century as an important means towards social change set out by such leading figures of the field as Eduard Lindeman and Richard Tawney whose career was 'marked by an outstanding capacity to combine scholarship sighted with practical actions on a wide variety of educational and political fronts'.

Erosion of autonomous and community interests

So what important dimensions of the everyday lives of adults are being betrayed, though inadvertently, by adult educators wedded to the cult of efficiency as an orientation to pedagogical practice?

Critical dimensions of everyday life that are always threatened by the cult of efficiency can be identified, for example, in Ivan Illich's thought- provoking study on 'Vernacular Values and Education'. Here, Illich focuses primarily on how the rationalized development of spoken and written language in the West has shaped the way people experience their world in line with the bureaucratic needs of the state. Language reflects experience, and the interests of the modern state require that, in general, we experience the world within certain parameters. Illich's analysis lays out the whole arena of crucial practical and ethical values of everyday living that are being eroded by the kind of rationalization and technicist perspectives exemplified in the development of modern European languages. This development has meant the loss of important human values that are embedded in vernacular idioms. The following extracts make explicit the kind of values Illich has in mind when he evokes the idea of the vernacular:

Vernacular comes from an Indo-Germanic root that implies 'rootedness' and 'abode'. "Vernaculam" as a Latin word was used for whatever was homebred, homespun, homegrown, homemade, as opposed to what was used in formal exchange... We need a simple straightforward word to designate the activities of people when they are not motivated by thoughts of exchange, a word that denotes autonomous, non-market related actions that by their very nature escape bureaucratic control, satisfying needs to which, in the very process, they give specific shape ... By speaking about vernacular language and the possibility of its recuperation, we trying to bring into awareness and discussion the existence of a vernacular mode of being, doing, and making that in a desirable future society might again expand all aspects of life.

Here, at any rate, Illich does hold out the possibility that some values and modes of being needed for autonomous lifestyles, though threatened, can be preserved and that others, already lost, might be regained. However, he again highlights the psychic damage wrought in our everyday living, and the undermining of genuine autonomous activities, by the onslaught of extreme rationalization and technicist orientations in a brilliant essay entitled 'Silence is a Commons'.

The 'commons' is a metaphor illich uses to draw attention to those traditional areas of everyday living that are so vital to our well-being. Again, it is clear from the analysis that the cult of efficiency, the inappropriate deployment of technique, is eroding this precious area of community life. Elsewhere, Jürgen Habermas, the eminent critical theorist of the Frankfurt School, has identified this phenomenon as the colonization of our life-world.

Adult educators in today's society have been remiss in not shaping their practice to help preserve the vitalistic values and practices that are continually being eroded from the pressure of those standardizing strategies embedded in the cult of efficiency. A more depressing, though perhaps realistic interpretation, is that professional adult educators are in the vanguard of those who are concerned to teach us how to embrace and cope with technicist forces that are slicing away at those values and day-to-day human activities which Ivan Illich so insightfully depicts in his essays on vernacular values and the 'commons'.

In One Dimensional Man: Studies in the Ideology of Advanced Industrial Society, Herbert Marcuse dealt with the harmful effects that technicist developments and the concomitant erosion of crucial ways of life have rendered on the psyches of modern men and women. One of Marcuse's many graphic accounts of the predicament of one-dimensional man runs as follows:

> The political needs of society become individual needs and aspirations, their satisfaction promotes business and the commonweal, and the whole appears to be the very embodiment of Reason.

Twenty years ago, Marcuse's analysis indicated that the tendency of technology to institute more effective controls was accompanied by increasing standards of living for the majority. The later prospect is no longer assured but there are now far more impressive examples to substantiate Marcuse's claim that 'the technological society is a system of domination which operates already in the concept and construction of techniques'.

Domination in the sense used by Marcuse does not require overt coercion by military and para-military forces as is the case in modern totalitarian regimes. The expansion of technocracy in most Western societies makes that unnecessary. The values and opinions of a vast and, by all accounts, growing number of illiterate and semi-literate adults are readily shaped by the vested interests of technocratic society. Many of these people, usually referred to by American educators and sociologists as 'functionally illiterate', are kept in a state of immaturity. For while they can absorb information, their critical powers of insight have been left undeveloped. They really do have extreme difficulty in dealing with concepts that cannot be reduced to true and false responses. Hence, they fall prey to the simplistic television media of the President's men, carefully orchestrated commercial touting the virtues of unabashed consumerism, and the dogmatic assertion of fundamentalists who have cleverly staked out so much broadcasting time in the electronic box.

The power of television cannot be minimized. It lends itself so completely to the delivery of efficiently packaged uncomplicated messages for absorption by passive spectators.

courses scheduled, certificates awarded, competences achieved, continuing education units mandated, and so on. There is, with such an agenda, no time to consider seriously suggestions that a technocratically educated populace could fall nicely under the sway of any despotism.

Of course, adult educators cannot be held entirely to account for the negative developments of a technocratic society and its coercive effects as analysed by writers like Illich, Marcuse, and Habermas. However, the problems we have posed in the preceding pages begin to lay out the terrain on which an authentic vocation of adult education can be practised. In subsequent chapters we shall be identifying the kind of orientations and strategies that become contextually relevant to vocational practice. These constitute a significant role for adult educators in today's society in light of the problems we have addressed. At this juncture, though, it is important to emphasize again that we are not advocating a romanticized anti-technical stance. Rather, we are envisaging a shift in deployment, as it were, in which technological discoveries, and the methods patterned on them, are incorporated to practical needs for the enhancement of 'vernacular competence'. Technology shaped to meet practical needs rather than the expensive, often wasteful, demands of an advanced consumer society. Adult educators can make a start by refusing to be involved in the formulation and deployment of a standardized curriculum that reinforces socialization to technocratic norms.

A reliance on instrumental approaches, standardized techniques, in adult education does play a significant role in foreclosing on prospects for facilitating more genuine democratic decision-making. Yet adult education provides a legitimate context where, in face-to-face interaction, competence in the kind of rational discourse and identification of relevant information that must precede genuine democratically determined projects of action can be learned. We are referring here to learnable strategies that lead us towards what Jürgen Habermas has characterized as communicative action.

Communicative action describes an ideal, though conceivably achievable, group learning experience where participants put forward their own views on the problem at hand, listen carefully and respectfully to those of others, and seriously examine all relevantly identified information introduced to the situation. It does not take the form of a debate, or the mere weighing of pros and cons. The process is more rational and democratic—a kind of on-going, thoughtful, conversation. All participants anticipate that their individual contributions will receive serious consideration from others. At the same time, they remain open to changing or to reconstructing their own stance on the problem under consideration in the light of what others have to say and on the weight of all relevantly identified information. In this way, distortions and coercive elements that characterize so much of our normal day-to-day interaction are identified and can be eliminated of, at least, confronted for what they are. Communicative action, then, represents a worthwhile state of affairs that adult educators can seek to achieve in a wide variety of contexts. It entails a predisposition towards decision-making processes where all participants are engaged in rational discourse that emerges from a genuinely democratic situation.

If the conditions described here refer us to an ideal situation, efforts to attain it are worthwhile even though we fall short. Through such efforts we at least begin to appreciate the practical value of an inter-subjective understanding that comes from individuals being open to what others have to offer while, at the same time, being willing to present their own viewpoints for critical assessment. Such are the conditions that provide a basis for rational, genuinely democratic, decision-making. They cannot be taken for granted, and they have to be learned. The process is emancipatory in intent and does not seek foreclosure from the deployment of standardized formulations, predetermined techniques, at the outset.

Communicative action is, at one and the same time both rational and emancipatory in intent because progress towards inter-subjective agreement along the lines described is accompanied by a disclosure of coercive structures that stand in the way of arriving at projects of action formulated through a genuinely democratic process. Herein lies the challenge for adult educators. The process has to be learned through the acquisition of communicative competence. And this does not simply entail the passing on of readily definable skills. It requires practice and the willingness to analyse continuously shortfalls in practice. An important part of the on-going educative task becomes one of identifying and confronting coercive structures that obstruct, and gloss over the need for, emancipatory rational communicative action as the prime source of everyday projects of action. We shall be returning to the theme of communicative action and its importance for adult education practice.

The trappings: co-operation and consensus

In subsequent chapters we will consider adult education orientations that are in keeping with efforts to realize genuine participatory decision-making. For now, it suffices to point out that much of current adult education practice, with its heavy reliance on technicist approaches to needs assessment, programme development, and standardized curriculum design, stands in the way of the kind of emancipatory process characterized by the notion of communicative action. Unwittingly, adult educators who uncritically embrace technicist ideology are contributing to coercive effects, even where these are not immediately apparent, that obstruct emancipatory learning endeavours. The situation becomes even more depressing when we consider the way emancipatory terminology is often co-opted in the service of quite prescriptive adult learning curricula. Hence, we come across individualized learning' and 'self-paced learning' to describe bureaucratically managed, often computer steered, programmes. These present us with the anomaly of directed 'self-directed learning'.

Even techniques employed by adult educators to engender greater participation from their clients tend to be quite manipulative and militate against genuine communicative decision-making. For example, the delphi technique, is sometimes employed by adult educators in North America as a mechanism for reaching consensus. The consensus is achieved among participating adults around concerns already identified by selected experts, usually external to the immediate decision-making group. Group participants are given the opportunity to rank and rate these already identified concerns and even add to some of their own. This constitutes the first round of the process. The results are reported to the participants again in the light of data from round one. There can be a number of rounds, allowing participants a chance to rank and rate issues on the basis of information processed in the preceding round. So the technique has all the trappings of democratic procedure, evading difficult and thoughtful discussion merited by complex issues.

However, further reflection on delphi and similar consensus forming approaches reveal how easily we fall for the illusion of technique. The systematizing structures of the process define a short cut to consensus that differs altogether from communicative action which allows individual— even idiosyncratic - viewpoints of all concerned to be taken into account from the outset as part of rational discourse. It does not start off from groundwork already laid out by a specially chosen group of experts although, of course, expert knowledge is incorporated as parties to the process determine its relevance for their practical purposes. This kind of approach to rational, democratically determined, inter-subjective agreement is difficult to facilitate and will frequently fall far short of satisfactory resolution, but it suggests a far more fruitful way to go for adult educators than techniques like delphi which delude us into regarding them as truly democratic. In fact, their systematic structures and formulations, impressive though they may seem in terms of efficiency, work against the acquisition of communicative competence. They foreclose on the kind of difficult discussion required if individual and community needs are to be identified in a participatory and democratic context.

Professionalization, the cult of efficiency, and mandatory continuing education

Reference to the role of experts in the preceding paragraphs brings us to the issue of professionalization as an aspect of the cult of efficiency. Adult educators are very caught up in this issue with regard to their own practice. Advocates of professionalization in adult education point to benefits, in terms of greater legitimation for the field of practice and assurance of competence for the public at large, that are said to accrue from licensure, certification, standardized minimum criteria for preparatory training, continuing professional education and the other trappings of modern professions. These professions are often served by adult educators who design, facilitate, teach and assess continuing professional education courses.

Arguments in support of professionalization are fairly straightforward. They are advanced on the grounds that professionalization provides, on the one hand, some assurance to the public about the competence of certified experts from whom they receive services and, on the other, job and income security for members of professional groups. Efficiency, expertise, and systematic organization of practice are frequently invoked as terms to characterize professional groups, especially the most successful and monopolistic among them. Unhappily, in today's society, taken-for-granted, uncritical acceptance of the expertise and efficiency of others, supported by certification, licensing, and other forms of credentialling, has led to excessive dependence on the professionals.

A tendency of professionalization to infantilize adults in more and more arenas of everyday life exemplifies yet another way the cult of efficiency both individual autonomy and rational community values. The latter begin to be shaped by professionalized norms. For example, though it might, arguably, be appropriate for most babies to be born in hospital, how many women would even begin to consider the benefits of giving birth to their children at home, even with help from a competent mid-wife, in view of the 'high tech' expertise of over busy, though wonderfully organized medical doctors of Western society? To ensure that not too much serious thought of rational alternatives to professionalized birthing occurs, the medical profession in North America has the support, at present, of the legal profession, which can outlaw such alternatives in modern society. At best, the cult of efficiency that sustains the medical profession makes the few women who opt to avoid professionalized birthing appear idiosyncratic.

Even though we could identify numerous instances of how professionalization has fostered irrational dependence, it is scarcely feasible to think in terms of a sustained programme that would de-professionalize modern society to the extent envisaged by Ivan Illich in De-schofeling Society. However, adult education has fallen short in not identifying and facilitating strategies whereby we can resist the further inappropriate encroachment of professionalization into our everyday lives and roll back its most repressive effects. This would entail creating an awareness of those activities and services which adults as individuals, or in groups, could undertake without placing themselves entirely in the hands of experts. Recourse to professionals would be relevantly determined as an intelligent option rather than as an automatic, taken-for-granted, course of action. At the same time as identifying practical strategies to retrieve human services from the monopolistic domain of professionalism, the adult education movement as a whole, not just a few academic critics, should have been at the forefront in raising questions about the legitimacy and rationality of moves in the direction of further professionalization in modern society and within the field of adult education itself.

The home-schooling and alternative community-based schooling movement is an example of where adults, for reasons which vary from one family to another, have selected for their children an alternative to the professionalized teaching of the state schools. It is not necessary to hold out for the entire de-schooling of society in order to resist monopolistic claims on expertise by professionalized educationalists. Parents of home-schoolers, and those educated in alternative community-based schools, are chiefly concerned about the well-being of their children but, at the same time, they are resisting the claims of this officially supported aspect of the cult of efficiency to determine the shape of their children's education. For them schooling becomes a matter of choice, not an official mandate.

Rather than supporting people towards authentic alternatives to a lifestyle that has become increasingly dependent on professionalized services at every turn, modern practitioners of adult education, especially in the United States and Canada, tend to concern themselves with enhancing the knowledge base of professionals. The notion is that this focus guarantees further efficient service to the public. But it is not just a matter of ensuring designated experts become more competent. An unchecked trend towards strengthening professionalized interests in society is accompanied by an erosion of autonomy in our everyday lives. Monopolistic tendencies of professionalized groups signify a de-skilling of the majority who are prevented from providing services in the professionalized domains for themselves and for others. This leads to greater dependence on the state apparatus and well organized vested interests.

We could argue, with considerable force, that it is neither possible nor desirable to dispense with the convenience of specialized services delivered by designated experts. However, it is feasible to envisage reversing some of the deleterious effects on today's society of an excessive tendency towards professionalism, reducing the widespread dependence it engenders. Further, it is reasonable to suggest that adult educators, on the whole, have been remiss in not confronting the serious consequences for the everyday lives of adults that stem from encroaching professionalization. Those adult educators who confine their commitment to the training of careerist professionals actually add fuel to a crisis that results from a cult of efficiency. When adult educators allow themselves a preoccupation with the professionalization of their own endeavours, they become very much part of the problem and abandon any real prospect of achieving an emancipatory, critical practice of adult education.

Unfortunately, the issue of professionalization is woven into the fabric of adult education practice in today's society. And it spoils the cloth. For professionalization with its array of legitimizing artifacts is, if anything, more problematic for the practice of adult education in today's society than its most determined critics have suggested.

The entire edifice of professionalization is sustained by the mechanisms of certification, licensing, and accreditation. Further, any really meaningful distinctions between these three legitimizing practices have become blurred. The ostensible purpose of certification, licensing, and accreditation is to give some assurance to society at large as to the quality of services provided by professionals while providing them with job security. However, to an extent which varies from one profession to another, these legitimizing mechanisms also confer monopolistic privileges on professionals. The amount of power, autonomy, and exclusivity accumulated by a particular professional group is discernible from how successful it has been in deploying the legitimizing mechanisms of certification, licensing, and accreditation to signify a clear-cut body of knowledge. This becomes, for the most powerful professions, an exclusive domain of well defined techniques in which only officially designed experts can lawfully practise. Clearly, medical doctors, for example, have been more successful in this regard than public school teachers. Up to now, associations of medical doctors have managed to keep the legitimizing mechanisms for determining who shall or shall not be permitted to practise within their own hands, and they have been relatively successful in thwarting attempts by others to carve out professions within the wide domain of medical care. The case of the medical profession, in particular, demonstrates how professional preparation is tied in to mechanisms of systematic legitimation which confer power and monopolistic privileges on doctors that are not in themselves demonstrably warranted as the only practical way to satisfy the health and medical needs of the populace.

In addition to bestowing power and monopolistic privileges on professionals, certification, licensing and credentialling are widely viewed as indicators of technical competence. Therefore, in order to keep step with the continuing surge of technical innovations, it has become necessary to support their function as legitimizing mechanisms through mandatory continuing professional education. If they want to retain their licences more and more professionals are being compelled to take continuing education, though thoughtful writers both for and against mandatory continuing education agree that it cannot be shown to guarantee competent performance. Even if it were possible to demonstrate a convincing causal connection between mandatory continuing education and concomitant performance, there are some who would continue to question, from an ethical standpoint, the whole business of forcing adults back to school. For them mandatory continuing education represents yet another stage in the surrender of individual autonomy, an invasion of personal discretionary time, to the stipulations of a technical rationality. It is true that many professionals are in favour of mandatory continuing education on the grounds that it obliges them to keep up to date. The questions that might arise about what this acquiescence says of a mature commitment to their work and a willingness to undertake relevant continuing education on their own initiative tend to be overlooked. Further, it is important to consider, in a wider ethical context, the significance of this cavalier acquiescence on the part of relatively privileged professionals for less powerful members of our society. If doctors, dentists, and lawyers are willing to accept mandatory continuing education, what right have welfare recipients to even question having to go back to school in order to maintain eligibility for their monthly cheques? The willing surrender of autonomy in many significant area of everyday life, and by one influential societal group does have ripple effects on other social contexts.

Mandatory continuing education is not just confined to professional groups: an entire corpus of literature on the topic, both for and against, has served to make it an issue among adult educators in the United States and Canada, where mandatory continuing education has been in vogue for longer and is more widespread than in other countries. Unfortunately, the earnestness required to keep dialogue open in the face of burgeoning mandatory continuing education initiatives begins to flag. Not surprisingly, critics tend to become disheartened, preferring to retire from the fray rather than continuing to sustain a critical analysis which is too readily dismissed, in the context of an overarching cult of efficiency, as tiresome and utopian. Yet it is important that the issue of mandatory continuing education remains problematic. Without sustained questioning on ethical and practical grounds, the discourse of a technical rationality which justifies implementation of mandatory stipulations because they might lead to greater efficiency and overall competence soon becomes taken for granted. Despite the number of thoughtful essays which question mandatory continuing education, there is a powerful inclination to feel that the questioners have had their day and that the real task ahead is to deploy mandatory continuing education programmes as effectively as possible. This inclination to foreclose on critical analysis and to discourage further resistance is unfortunate. It begins to appear that the rationality of mandatory education measures has prevailed over a more democratic disposition to enshrine voluntary participation in adult education. Thus, the way is open for an expansion of scarcely examined policies that support the compulsory education of adults.

technocratic practice without any mediation from adult educators. There is, however, a very vital role for adult educators to play in retrieving bits of the 'commons', and in working to resist further erosion through a critical pedagogy. This entails maintaining a high level of ethically based critical discourse and practice on behalf of less empowered groups in society, and on the avoidance of uncritical acceptance of technocratic innovation to the adult education endeavour. An anti-technicist stance is not ani-technological, nor is it against the acquisition of technical competence.

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Adult Learners

When adults teach and learn in one another's company, they find themselves engaging in a challenging, passionate, and creative activity. The acts of teaching and learning-and the creation and alteration of our beliefs, values, actions, relationships, and social forms that result from this-are ways in which we realize our humanity. The extent to which adults are engaged in a free exchange of ideas, beliefs, and practices is one gauge of whether a society is open, democratic, and healthy. If adults of widely differing class and ethnic groups are actively exploring ideas, beliefs, and practices, then we are likely to have a society in which creativity, diversity, and the continuous re-creation of social structures are the accepted norms. By contrast, societies in which inquiry, reflection, and exploration are the prerogative of a privileged minority are likely to be static, ossified, and hierarchical.

It would be easy for professional educators to translate the above argument into a declaration that a society can be considered healthy to the extent that it provides publicly funded learning opportunities for adults. This may be one indicator of a just society, but it is not the only one and it neglects the enormous amount of significant adult learning, individual and collective, that takes place outside formal educational settings. The teaching-learning transactions undertaken by adults are complex and multifaceted, and they steadfastly refuse simple categorization. They occur in every setting imaginable, are conducted at different levels of significance to the learner, are oriented toward a variety of cognitive, affective, psychomotor, and political ends, and involve a range of formats and methods.

In all these instances, several commonalities are observable. At a very basic level, of course, the participants involved are adults: that is, they have attained the legal and chronological status of adulthood. Second, they are engaged in a purposeful exploration of a field of knowledge or set of skills or in a collective reflection upon common experiences. Third, these explorations of knowledge, skills, and experiences take place in a group setting. Fourth, the participants in these explorations bring to the encounter a collection of experiences, skills, and knowledge that are going to influence how new ideas are received, how new skills are acquired, and how the experiences of others are interpreted. As Gange has observed, every adult's stock of prior learning and experience coheres into a unique, idiosyncratic mediatory mechanism through which new experiences and knowledge are filtered. Hence, as educators we can never predict with total certainty how one adult will respond to being presented with new ideas, interpretations, skill sets, experiences, or materials. Fifth, such prior learning and experience also comprise valuable curricular resources. In the examples of the teaching-learning transactions mentioned earlier, the topics discussed, themes explored, experiences interpreted, skills acquired, and knowledge investigated will be influenced by, and will draw upon, this prior learning and experience. The tenants, managers, school principals, shop stewards, single parents, and nonreaders will identify common problems, voice common concerns, specify skills in which they feel that they are deficient, and provide experiences upon which others in the group can reflect.

Finally, the transactions in these groups will be characterized by a respect for individual members that will be manifest in the procedures used. These groups will probably use discussion methods that will allow individual members' contributions to be jointly interpreted and explored; and, if the group leader is acting as a good facilitator, no one member will be cajoled, insulted, or intimidated by the pressure of majority opinion. Leadership of some of these groups will be rotational, and individual members will, at different times and for different purposes, assume temporary leadership of the group. Even where an appointed leader is present, it is likely that he or she will feel no sense of professional dereliction in surrendering "authority" to allow group members to voice concerns, change the curricular focus, and alter previously agreed-upon rules of group conduct. Integral to this climate of respect for individual members is an expectation that the teaching-learning process will be distinguished by a continual negotiation of objectives, methods, and evaluative criteria.

Principles of effective practice

Before proceeding to further discussion of facilitating learning, we should clarify the central principles of effective practice. These principles apply chiefly to teaching-learning transactions or to curriculum development and instructional design activities that support teaching-learning encounters and not to marketing, budgetary, or administrative tasks.

Let us consider, then, the following six principles of effective practice in facilitating learning:

- Participation in learning is voluntary; adults engage in learning as a result of their own volition. It may be that the circumstances prompting this learning are external to the learner but the decision to learn is the learner's. Hence, excluded are those settings in which adults are coerced, bullied, or intimidated into learning.
- Effective practice is characterized by a respect among participants for each others self-worth. Foreign to facilitation are behaviours, practices or statements that belittle others or that involve emotional or physical abuse. This does not mean that criticism should be absent

from educational encounters. It does mean though that an attention to increasing adults' sense of self-worth underlies all facilitation efforts.

- Facilitation is collaborative. Facilitators and learners are engaged in a cooperative enterprise in which, at different times and for different purposes, leadership and facilitation roles will be assumed by different group members. This collaboration is seen in the diagnosis of needs in the setting of objectives, in curriculum development, in methodological aspects, and in generating evaluative criteria and indexes. This collaboration is also constant, so that the group process involves a continual renegotiation of activities and priorities in which competing claims are explored, discussed, and negotiated.
- Praxis is placed at the heart of effective facilitation. Learners and facilitators are involved in a continual process of activity, reflection upon activity, collaborative analysis of activity, new activity, further reflection and collaborative analysis, and so on. "Activity" can,of course, include cognitive activity; learning does not always require participants to "do" something in the sense of performing clearly observable acts. Exploring a wholly new way of interpreting one's work, personal relationship, or political allegiances would be an example of activity in the sense.
- Facilitation aims to foster in adults a spirit of critical reflection. Through educational encounters, learners come to appreciate that values, beliefs, behaviors, and ideologies are culturally transmitted and that they are provisional and relative. This awareness that the supposed givens of work conduct, relationship, and political allegiances are, in fact, culturally constructed means that adults will come to question many aspects of their professional, personal, and political lives.
- The aim of facilitation is the nurturing of self-directed,

> empowered adults. Such adults will see themselves as proactive, initiating individuals engaged in a continuous re-creation of their personal relationship, work worlds, and social circumstances rather than as reactive individuals, buffeted by uncontrollable forces of circumstance.

These six principles of facilitation have numerous implications for practice that will be discussed throughout this book. They are observable in many different settings, some of which are formally called "adults" or "continuing" education, some of which are designated as "training," and others that are recognized by other descriptions. In general terms, though, a number of direct practice implications are immediately derivable from each principle.

Voluntary Participation. The fact that adults engage in an educational activity because of some innate desire for developing new skills, acquiring new knowledge, improving already assimilated competencies, or sharpening powers of self-insight has enormous implications for what facilitators can do. First and foremost, the educator has no need to spend a great deal of time and energy dealing with outright defiance, veiled opposition, or studied indifference among learners. Those who teach adults in the evening and children or adolescents during the day constantly refer to the difference in satisfaction, and fulfillment derived from working with the two groups. Because adults' motivations to learn are high, the facilitator is prompted to expend a similarly high level of effort and ingenuity in designing educational experiences and in teaching. Adults' willingness to learn also means that they are less likely to resist participatory learning techniques such as discussion, role playing, games, small-groups work, and collaborative analysis of persònal experiences.

The voluntary nature of participation by adult learners also means that such participation can easily be withdrawn if learners feel that the activity dose not meet their needs, does not make any particular sense, or is conducted at a level that is incomprehensible to them. The same holds true, of course, if learners feel that they are being treated in a humiliating or insulting manner. Facilitators thus have to pay close attention to curriculum development and educational process. Curricular themes for examination and topics to be discussed have to be grounded in adults' experiences, or at the very least there must be explicit connections made between unfamiliar concepts or bodies of knowledge and the current preoccupations for past experiences of learners. This can be done by selecting appropriate resource materials and by framing the investigation of new ideas, skills, or information in terms that are accessible to the learner, given his or her past experiences.

The importance of ensuring that new knowledge, concepts, skills, or frameworks of interpretation are presented to adult learners in a manner that is comprehensible in terms of their own experiences is a major reason for using participatory learning methods. A mass instructional technique such as a lecture may, as Bligh notes, be useful in presenting information in short, twenty-minute periods. As a host of research studies cited by Bligh indicate, however, the lecture is of little use if the educator or trainer is seeking to promote critical thinking or to encourage adults to be more flexible in their attitudes. A one hour transmission of information in which there is no opportunity for questions, no small-groups discussion of case-study applications of ideas, no "buzz group" activity, and no attempt to make connections between the audience members' experiences and the lecture's content is, therefore, poor facilitation. Educators who ignore the use of participatory techniques will find that their learners are physically absent in increasing numbers or are mentally absent in the sense of not being actively engaged with the ideas, skill, and knowledge being presented.

Mutual respect. A fundamental feature of effective facilitation is to make participants feel that they are valued as separate, unique individuals deserving of respect. To behave in a manner disrespectful to others, to denigrate their contributions, or to embarrass them publicly through extended attention to their apparent failings are behaviors that are, in educational terms, disastrous. Educators who behave in this manner will be faced with a number of consequences. They will find participants leaving, they will be unable to generate the goodwill required to conduct effective participatory learning exercises, and they will find learners so intimidated by the prospect of public pillorying or private censure that they will be unable to learn. Many of the same consequences will result if educators allow learners to behave toward one another in hostile or combative ways.

Good facilitation, then, is characterized by a respect for participants' uniqueness, self-worth, and separateness. This does not mean, however, that educational encounters are characterized by some kind of universal bonhomie or false camaraderie under which fundamental differences are buried. Central to the effective facilitation of learning is the development of powers of critical reflection, and this means that adults will frequently be challenged by educators and fellow learners to consider alternative ways of thinking, behaving, working, and living. But this challenging of others' ideas and attitudes and this prompting of analysis of one's own behaviors and beliefs must occur in a setting where dissension or criticism of another does not imply some kind of personal denigration. As Brew has observed with regard to discussion groups, it is easy for educational encounters to degenerate into "numbers of people slamming shut their minds in one another's faces". Unless participants evolve what Bridges calls a "moral culture" governing educational interactions, then learners will react to being challenged or to being confronted with alternative and unfamiliar ways of thinking about their work, relationships, or beliefs with resistance and a dismissive mistrust.

One of the most daunting and difficult tasks of the facilitator, then, is to set a climate for learning and to assist in the development of a group culture in which adults can feel free to challenge one another and can feel comfortable with being challenged. Without such a climate or culture, teaching-learning encounters run the risk of becoming nothing more than exchanges of entrenched opinion and prejudice, with no element of challenge and no readiness to probe the assumptions underlying beliefs, behaviors, or values. It is useless to run a staff development workshop in which participants compliment each other, repeat the public norms of the organization, and confirm prejudices but never address fundamental differences in philosophy or practice. What is valuable, however, is the honest expression of differences, in an atmosphere where challenge and dissension are accepted as part of the educational process.

Collaborative spirit. The existence of some kind of participatory and collaborative element is perhaps the most frequently cited difference between school education and the education of adults. In the former, standards, syllabi, materials, and evaluative criteria are generally externally defined according to local or national governmental regulations and requirements. In the latter, principally because formal accreditation or certification is not the aim of most adult education programmes, there is often collaboration in assessing needs and generating objectives, methods of learning and evaluative procedures. There is also an alternation of educational roles so that at different times various members of the adult learning group will assume responsibility for posing questions, identifying materials, suggesting priorities, and organizing aspects of the group process.

Such collaborative activities are, of course, grounded in the features of voluntary learning and respect for participants. Acknowledging the accumulated experiences of adults as valuable educational resources is frequently touted as a defining principle of adult education, but this can be achieved only through some collaborative medium. The distinct tradition in the facilitation of adult learning is that of adults meeting as equals in small groups to explore issues and concerns and then to take action as a result of these explorations. We can see this in the workers' education movement, the junto, community development initiatives such as the Antigonish movement, community action projects in Liverpool and Northern Ireland the living room learning groups in British Columbia experiments using mass media such as the Canadian Farm Forum BBC wireless discussion groups and the Great Books program as well as in the establishment of residential centers for community development such as the Highlander Folk School and the Ulster People's College .

Action and reflection. In the education and training of adults, the term praxis is closely associated with the ideas and literacy activities of Brazilian educator, Paulo Freire. In several works he discusses a number of specific techniques that were used to help South American illiterates acquire literacy skills. In developing these skills, learners would gradually become aware of forces and structures that were keeping them in a position of dependence. Central to this concept, however, is a process long ago recognized as fundamentally educational by such philosophers of education as Dewey and Neill. This process centers on the need for educational activity to engage the learner in a continuous and alternating process of investigation and exploration, followed by action grounded in this exploration, followed by reflection on this action, followed by further investigation and exploration, followed by further action, and so on. This notion of praxis as alternating and continuous engagements by teachers and learners in exploration, action, and reflection is central to adult learning. It means that exploration of new ideas, skills, or bodies of knowledge do not take place in a vacuum but are set within the context of learners' past, current, and future experiences. In settings where skills are being learned, whether literacy skills, craft skills, or political advocacy techniques, this praxis is easily observable. Learners become acquainted with skills, apply these in real life settings, reflect with other learners on their experiences in these settings, redefine how these skills might be altered by context, reapply these in other real settings, and so on.

This is the familiar mechanism of internships and field experience as used in numerous training settings.

In activities concerned primarily with changes in consciousness, attitudinal shifts, explorations of new interpretations of the world, or paradigm shifts of some kind, the same principle of praxis obtains. In these instances, the process is less easily observable as it occurs chiefly through the acquisition of new mental sets. Even here, however, it is hard to imagine anything other than the purest form of philosophical meditation or introspection occurring without the learner's renegotiating certain aspects of his or her relationship, social world, or work life. Adults do not acquire and internalize ideas, skills, knowledge, and insights in a context-free vacuum. They interpret these through the mediatory mechanisms they have developed, assign meaning to them, codify them according to categories they have evolved, and test them out in real life settings. In curriculum design, selection of materials, and use of educational methods, therefore, facilitators should anticipate, and build upon, this tendency of adult learners to interpret, understand, codify, and assign meaning to new ideas, insights, skills, and knowledge in the context of their own experiences.

Critical reflection. That effective practice aims to foster an attitude of healthy skepticism is a prescriptively based notion, and, as such, it is disputed by some practitioners. They argue that facilitation means assisting adults to acquire skills, knowledge, ideas, and insights that have been defined by the learners themselves. This latter idea is said to exemplify a democratic, student-entered approach to learning, since it assigns to learners the responsibility for assessing needs, identifying educational aims and objectives, and generating evaluative criteria.

Facilitating learning is, however, a collaborative enterprise, and this has implications for more formal settings where the role of "educator" can be clearly identified. In these setting the educator's values and priorities will influence the educational encounter just as do those of the learners. It is my contention that learning is being effectively facilitated when the educator is prompting in learners a sense of the culturally constructed nature of knowledge, beliefs, values, and behaviours. But to develop this awareness, the facilitator must present alternative interpretations of learners' work lives, personal relationships, and views of the social and political world. this does not mean that the facilitator must try to convert or brainwash learners into accepting some new ideology. It does mean, though, that education must be distinguished from training. In training, a set of clearly identified skills are transmitted, and adults are required to assimilate these in the manner prescribed by the trainer, employing agency, or certification body. In education, by contrast, learners are encouraged to examine the assumptions underlying the acquisition of skills, to consider alternative purposes, and to place skill acquisition in some broader context.

This is very far from assuming, however, that learning cannot be facilitated effectively in training contexts. In the field of adult basic education, there are many instances in which educators have placed the acquisition of pre-defined skills in a context that encouraged learners to develop a critically questioning frame of mind. Such an attitude lies at the heart of Freirean methods and is exemplified in practical activities such as work with the elderly community education, work with college students, the promotion of industrial democracy and work with immigrant women in industrial societies. Manuals of basic education and studies of illiterates stress the development of a positive self-concept, the feeling of self-confidence, and the affirmation of self-esteem that result from coming to view the world differently through learning a language.

The point is that education is centrally concerned with the development of a critically aware frame of mind, not with the uncritical assimilation of previously defined skills or bodies of knowledge. Even within staff development or training activities that seem to be defined by organizational priorities, rather than by the learning benefits acquiring to individuals, there is a realization that encouraging shop floor workers, line managers, supervisors, and executives to challenge existing norms, practices, and structures is essential. Analyses of human resource development, staff development manuals investigations into conditions for corporate success ,and studies of effective learning within organizations all stress the necessity for workers to be aware of underlying assumptions, norms, and uncritically accepted practices and to be encouraged to imagine alternative structures and practices. The eight lessons derived from an analysis of America's most successful companies include a willingness to experiment, and engagement in praxis, participatory involvement of all employees, and managers' acknowledgement of ambiguity. Similarly, the concepts of double-loop learning and deuterolearning developed by Argyris and Schon focus on the ability of workers to become aware of underlying norms, policies, and objectives, to view these as relative and determined by context, and hence to be proactive in advocating change and innovation.

Self-direction. The last principle of effective facilitation—that facilitators should assist adults to become self-directed learners-has now attained something of the status of an academic orthodoxy. As kidd has written, "It has often been said that the purpose of adult education, or of any kind of education, is to make of the subject a continuing 'inner-directed,' self-operating learner". This idea has been proposed by educators from Lindeman and Bryson to Rogers and Knowles. It is one of adult education's most enduring articles of faith, and, like many revered tenets, its meaning has been distorted or skewed by those who choose to define it as they wish. As recent critical re-examinations have made clear, self-direction as a concept runs the risk of being denuded of context and of coming to be viewed solely as a technique in much the same way as programmed learning is now conceived.

The body of research, practice, and theoretical speculation on self-directed learning will be reviewed later in this book, so an extended analysis at this point is inappropriate. It is important to say, however, that making adults self-directed learners does not simply mean assisting them to develop such skills as how to retrieve information or locate resources. Self-direction in learning is not a set of techniques that can be applied within a context of objectives and evaluative criteria that are determined by others. At the heart of self-directedness is the adult's assumption of control over setting educational goals and generating personally meaningful evaluative criteria. One cannot be a fully self-directed learner if one is applying techniques of independent study within a context of goals and evaluative criteria determined by an external authority. Self-directed learning in adulthood, therefore, is not merely learning how to apply techniques of resource location or instructional design. It is, rather, a matter of learning how to change our perspectives, shift our paradigms, and replace one way of interpreting the world by another.

As adults, we are generally enclosed within our own self-histories. We assimilate and gradually integrate behaviors, ideas, and values derived from others until they become so internalized that we define "ourselves" in terms of them. Unless an external source places before us alternative ways of thinking, behaving, and living, we are comfortable with our familiar value systems, beliefs, and behaviors. Teachers who rely on the same exercises and notes for thirty years, managers who continue to employ the same techniques of production organization, or programmers who run the same courses year after year are not going to decide to change these practices simply of their own volition. One task of the facilitator, therefore, is to present learners with alternatives to their current ways of thinking, behaving, and living. Adults who engage in this kind of double-loop learning in which they reflect critically on their assumptions and try to imagine alternatives are fully autonomous, self-directed learners. Such adults are likely to be involved in a continual reinterpretation, renegotiation, and re-creation of their personal relationships, work lives, and social structures.

Transactional dialogues

It will be clear from the foregoing discussion, and from descriptions of practice in later chapters, that there are two common approaches to thinking about the facilitation of learning. One of these we might recognize as an operational approach. In this approach, we regard as effective practice any activity in which adults are being taught how to acquire certain skills and knowledge, irrespective of content and context. If adults are learning, and others are arranging the conditions of instruction, then we are witnessing effective facilitation.

A contrasting approach to the facilitation of learning views effective practice not just as helping adults acquire skills and knowledge in a context—and content-free manner but as containing some intrinsic features regarding the process and content of teaching and learning. Hence, educational encounters in which learners are abused or intimidated or racial prejudices are encouraged would not be regarded as facilitation in its fullest sense. Neither would we regard as good practice those instances in which adult learners are reproduced in the image of the facilitator, that is, when they mirror his or her ideas and beliefs exactly and demonstrate no capacity for critical reflection. Finally, this approach would exclude activities in which the learner is given no say in the method, aims, or content of the teaching-learning transaction and in which any deviation from a preset facilitator norm is met with exclusion from the educational activity.

This alternative approach is an intrinsic approach: It recognizes that education is value based and that facilitators should therefore be explicit concerning the values on which their ideas of good practice are based. The basis for this second approach is that education is credentially a transactional encounter in which learners and teachers are engaged in a continual process of negotiation of priorities, methods, and evaluative criteria. Viewing teaching-learning encounters as transactional means that the sole responsibility for determining curricula or for selecting appropriate methods does not rest either with the educator or with the participants. If the first obtains, then we have an authoritarian style and a one-way transmission of knowledge and skills that exemplifies all the worst aspects of the banking system of education or what Lindeman called the additive process, whereby the teacher receives from students precisely what has already been imparted from the teacher's academic repository, and the educator retains total control over the goals, content, and evaluative criteria of the educational activity. If the second approach prevails and curricula, methods, and evaluative criteria become determined solely by what learners say they want, then we run the risk that a service rationale or a "cafeteria" approach will govern what passes for education. If the educator simply meets those needs articulated by groups and individuals, he or she may function as little more than an administrator, publicist, and budget specialist. Skills of administration, marketing, and financial management are certainly important in order to create the conditions under which teaching and learning can occur. We should be careful, however, of confusing the exercise of those skills with the sum total of what it means to be an effective facilitator.

Accepting the felt needs rationale and giving learners what they say they want mean that the facilitator has abdicated responsibility for contributing to the debate about normative standards, values, and criteria in training and education. To say one is meeting felt learner needs sounds humanistic, learner centered, and admirably democratic, yet to do so without allowing one's own ideas, experience, insights, and knowledge as an educator to contribute to the educational process makes the facilitator a service manager, not a fully participating contributor. It also condemns learners to staying within their own paradigms of thinking, feeling, and behaving. Since it is very difficult to generate alternative ways of thinking about, and behaving in, the world entirely as a result of one's own efforts, an important task of the facilitator is to present to learners diverse ways of thinking and acting.

One of the greatest myths that has sprung from an acceptance of the felt needs rationale is the belief that learning is always joyful, a bountiful release of latent potential in which the learner is stimulated, exhilirated, and fulfilled. This often happens. But it also often the case that the most significant learning we undergo as adults results from some external event or stimulus that causes us to engage in an anxiety-producing and uncomfortable reassessment of aspects of our personal, occupational, and recreational lives. This external stimulus may be a calamitous event, such as being fired, experiencing the death of a parent, sibling, or spouse, going to war, our coping with a divorce. The learning in which we are forced to engage as a result of these events may be unsought and may have many painful aspects. Nonetheless, we may regard such learning as highly significant, precisely because it caused us to question our ways of thinking and behaving in our personal relationships, occupational lives, or social activities. Such questioning is initially uncomfortable and may be resisted, but it will often be the cause of our deciding to change some aspect of our lives. As anybody who has renegotiated an intimate relationship, who has confronted a parent, or who has attempted to change the patterns of relationships and activities in the workplace knows, to question the validity of the assumptions under which he or she has been living and to try to change the habitual activities and responses of oneself and others are not always joyous, releasing, and exhilarating experiences. We may conclude after this act of learning that the pain and anxiety were worthwhile, since they resulted in our living more fulfilling and stimulating lives. But as we are forced to undergo this reexamination of values, beliefs, behaviors, and assumptions about ourselves and those around us, we may find the activity to be an unsettling, painful struggle in which glimpses of insight alternate with confusion, uncertainty, and ambiguity.

The contribution of the facilitator to the teaching-learning transaction is somewhat of the order of the calamitous events mentioned earlier. It is not enough for educators and trainers to say to learners, "Do what you want, learn what you want, in whatever manner you wish, because you are the sole determinants of your educational destinies." This resembles a conversation in which one partner agrees with whatever the other says. Such conversations may be initially agreeable, but eventually one begins to suspect that the listener who responds to one's every comment and suggestion with enthusiastic agreement is not really listening at all. A conversation, after all, is also a transactional dialogue in which the comments and contributions of the participants build organically on each other's views and in which alternative viewpoints, differing interpretations, and criticism are elements essential to the encounter.

We may think of facilitation in much the same way, as a transactional dialogue between participants who bring to the encounter experiences, attitudinal sets, and alternative ways of looking at their personal, professional, political, and recreational worlds, along with a multitude of differing purposes, orientations, and expectations. The particular function of the facilitator is to challenge learners with alternative ways of interpreting their experience and to present to them ideas and behaviors that cause them to examine critically their values, ways of acting, and the assumptions by which they live.

We should note here that there is an enormous difference between facilitation and attempts at political or religious conversion in that in the latter activities the political or religious ideologies have predetermined the learning outcomes of the activity. They possess an ideology that they feel comprises the one true way of living in and thinking about the world, and views that do not coincide with these ideologies are deemed to be examples of bad faith, false consciousness, or wrong thinking. In effective facilitation, by contrast, the educator may hold beliefs about how people should think and act that he or she passionately espouses, but such beliefs are presented to learners for the same critical scrutiny and analysis that the participants apply to ideas of which the educator is personally critical. The end of the encounter, in other words, has not been preordained as the acceptance by participants of the facilitator's values and beliefs. Educators would be foolish to deny that they possess their own beliefs or to pretend that they are blank pages on which philosophies and values are yet to be written.

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Adult Development

Adult educators, who in many respects are critical consumers of ideas about teaching and learning, seem to have a weakness when it comes to critically evaluating theory and research in adult development. This weakness is perhaps due to the belief that the identity of adult education is promissed on the identity of the adult. Hence the literature on adult development is attractive because it offers the promise of a distinct and coherent theory of adult learning.

Published accounts of the adult learning process nearly always make reference to life-span developmental stages, the life cycle of the 'phases' of adult life. In a similar way many policy documents in adult and continuing education stress the importance of addressing the needs associated with adult development and growth. Allman sets out the case for this interest in adult development. She observes that studies of adult life reveal it to be a period of change and development, much like that of childhood and adolescence. She argues that the results of such studies serve notice on the prevailing assumptions about adulthood—that it is a long period of stability where previously learned capacities, skills, attitudes and values are applied to one's activities at work, in the family, in leisure and in civic life. These assumptions need to be challenged because they 'clearly affect decision makers in the field of politics, education and social policy'. In education they are linked to the conventional view that the period of initial education equips young adults for the remainder of their working lives—a view which continues to inform political debate on educational priorities.

Arguments like these are convincing and we do need to revise our outmoded views about adult life. But, as we shall argue we need to proceed with caution, otherwise there is a risk of replacing one set of false beliefs with another equally false set of beliefs about adult development.

This chapter reviews some of the connections which have been made between adult development and adult education. The second part focuses on evaluating the adequacy of existing theory and research in this area.

A question commonly posed by those with an interest in adult learning is 'What are the implications of adult development for adult and continuing education practitioners?' Knox outlines three possible implications:

1 To predict and explain success in education: 'Practitioners are typically interested in developmental generalizations regarding performance or personality in order to predict and explain successful participation in educative activity'.

2 To help people adapt to changing adult roles: 'Adult life cycle trends in performance in family, occupational and community roles suggest ways in which continuing education participation might facilitate adaptation and growth related to each role area'.

3 To improve the effectiveness of marketing and instructional activities: 'From time to time, the stability of adulthood is punctuated by role change events such as the birth of the first child, a move to another community or retirement... Such change events typically produce heightened readiness to learn which, if recognized, can contribute to the effectiveness of marketing and instructional activities'.

The whole tenor of the above implications indicates a view about adult development and an attitude to adult education. That is, that the various 'roles' of adult life are inevitable and people must learn to cope with them as they arise; and that adult education agencies, if they wish to be successful, should gear their marketing and instructional activities to cater for the different needs of adults at different life-stages. There is no sense in which adult roles are portrayed as arbitrary or even oppressive, or that alternative roles and options are possible for a given life period. In this sense adult education contributes towards the maintenance of social norms and structures.

One need not look very far to find other instances of this type of approach. A significant example can be found in McCoy's tabulation of 'Adult life cycle tasks and educational program responses' which is reproduced in Chickering's influential volume The Modern American College. McCoy identifies seven developmental stages, each of which is characterized by a set of common tasks. For example, the 'leaving home' stage has the associated tasks of 'break psychological ties', 'choose career', 'enter work', 'manage time' and so on. Each stage is then related to an appropriate range of programme responses, with a final column indicating the outcomes sought from the educational re-programme.

A casual glance at the list of tasks and how each of them relates to specified programmes confirms my general point about adult education supporting the status quo. Even a non-specific 'task' such as 'achieving autonomy', is interpreted in the most narrow sense possible - that is, as the capacity to 'live alone successfully'. It is unnecessary to elaborate further, the tabulation speaks for itself. What is surprising, and disappointing, is that anyone in adult education would take such an analysis seriously as anything other than a narrow descriptive exercise.

Yet there is a strongly held view among adult educators that the everyday reality of learners should be acknowledged, no matter how culturally specific that reality may be. The reader may remonstrate that McCoy is simply following this precept—what, then, is so objectionable? As I see it, there are two objections. The first of these is that there is no acknowledgement of the narrow culturally specific 'tasks' which are identified. Quite the opposite, the 'tasks' are presented as a generalizable framework to be used by adult education agencies in formulating their programmes. There is no sense in which McCoy is using her analysis as a case study of a process for others to emulate in a different cultural context. The second objection, already mentioned in relation to Knox, is that the response of adult education is depicted as solely adaptive. There is no scope for questioning and challenging the tasks - they constitute the taken for granted reality of the learners and the adult educators.

There are many adult educators who, being dismissive of the above approach, nevertheless subscribe to the view that adult development is a central concept in adult education. An interest in adult development stems quite naturally from a commitment to the notion of lifelong learning and the associated concepts of 'lifelong education', 'recurrent education' and '*education permanente*'. The policy and research documents of UNESCO, the OECD and the Council of Europe, which are the major sponsoring bodies of these concepts, frequently cite adult development as a central concern of any lifelong learning strategy. However, they do not understand adult development to be an immutable sequence of stages through which people pass at more or less predictable ages. Indeed, they challenge the concept of the 'typical' life cycle and support their view with an analysis of contemporary social and economic change. This is particularly apparent in the literature on recurrent education, and the following extract, taken from an article by one of its chief proponents, Jarl Bengtsson, typifies this approach:

> Significant changes are taking place in the relationship between work and non-work time seen over the individual's whole life cycle in terms of increased education, earlier

retirement, longer holidays, etc. It has also been made clear that these changes affect social groups according to their hierarchical position in working life, as well as the way their work is being scheduled, *i.e.*, full-time, part-time, shift-work, long spells of employment, etc.

The claim is not that more non-work time is or will be used for education, although that certainly remains a strong possibility. Rather it is that to look at recurrent education from this perspective provides a very useful point of departure for placing it in the broader context of emerging new life-styles and life cycles. Most likely, the crucial factors behind changes in the individual's life-cycle pattern will be the economic and employment conditions that the industrialized countries will face during coming years.

Recurrent education, and its closely related concepts, accepts the diversity of life-cycle patterns and the need for educational institutions to respond to and foster this diversity through a diversity of provision. It supports the notion that individual options should be extended, especially the way in which paid work, education and leisure are combined. The principles espoused can be seen as a response to the effects of social, economic and technological change. Changes in demographic patterns, the sexual division of labour, the length of working life, hours spent at work, retirement age and so on, are all seen as relevant to the proposition that educational opportunities should be distributed, in a recurring way, across the life-span. Recurrent education also embodies the notion of social justice, and its evolution as a concept from the late 1960s has been linked with a host of terms implying broad social reforms: industrial democracy, participation in planning, social equity, decentralization, links between education and work and between younger and older generations, and concern with the disadvantaged. An underlying value in all this is a humanistic concern for the individual. The idea of self-development, which is based on notions of individuality and growth, is contrasted with the opposing notions of enslavement, alienation and stagnation—

which are the psychological consequences of clinging to an outmoded conception of the 'normal' life cycle.

There are two persistent problems which are a feature of adult developmental psychology. The first is that there are insurmountable methodological difficulties in establishing 'phases' or 'stages' of adult life. The second is that much of the literature is historically and socially rooted and lacks any worthwhile generalizability.

Methodological difficulties

Not all adult development studies adopt a stage-sequence approach; nevertheless, they usually have a stake in making comparisons between different 'ages', 'phases' or 'stages' of life. Leaving aside the problem of deciding what type of data to gather, the common methodological problem is to construct a research design which generates comparative data. Many of the most influential studies in adult development use research design which fail to do this. Three basic research designs are the 'cross-sectional', 'longitudinal' and 'time-lag' designs. Perhaps the best known example of this technique is to be found in the research of Gould. In an initial study Gould observed and recorded the concerns expressed by a number of psychiatric outpatients. He hypothesized that these concerns differed among different age groups. He then used these expressed concerns to construct a questionnaire which contained 160 questions divided into ten areas of life. This questionnaire was then administered, in a later study, to a sample of 524 non-patients, who were white middle-class men and women aged 16-50 years.

The difficulty with a research design such as this is that the observed differences in 'concerns' may be due to the different life experiences of the different age cohorts. For example, the life history of a 5-year-old in 1972 would necessarily include the 'great depression' of the 1930s and the experience of the Second World War. This would be quite different from the life history of 22-year-old in 1972 who would have experienced the economic boom of the post-Second World War years and the social changes of the 1960s. It seems reasonable to assume that such historical events and trends affect people's 'concerns'. Indeed they may be more significant in explaining the different concerns of different age cohorts than any hypothesized notion of the life cycle.

One way to avoid making comparisons between different cohorts is to investigate a single age cohort over a number of years. Ninety-four college graduates from the early 1940s were followed through until 1969. They were part of an initial study of 268 male undergraduates who were given extensive physiological and psychological examinations early in their college years. After graduation the sample of 94 graduates completed annual questionnaires untitled 1955, and every two years after that date. They were interviewed in their homes twice, between 1950 and 1952 and in 1969. Vaillant reports the results in detail, but his thesis is simple: that ego defence mechanisms mature through the life cycle and that healthy adults progress through a hierarchy of adaptive mechanisms as shown Table in next page.

There are some well-documented problems with long and practice effects and time-of-measurement effects. A significant problem, and one often overlooked, is that over, say, a 30 year period, there are bound to be shifts in the theoretical perspective of the theory upon which the research is based. This often means that the initial questions and modes of analysis become obsolescent and are replaced by more contemporary techniques. This certainly happened in Vaillant's study:

Unfortunately, the work of four other innovative

Hierarchy of adaptive mechanisms

Level I:	Psychotic mechanisms (common in psychosis, dreams, childhood)
	Denial (of external reality)
	Distortion
	Delusional projection
Level II:	Immature mechanisms (common in severe depression, personality disorders and adolescence)
	Fantasy (schizoid withdrawal, dental through fantasy)
	Projection
	Hypochondriasis
	Passive-aggressive behavior (masochism, turning against the self)
	Acting out (compulsive delinquency, perversion)
Level III:	Neurotic mechanisms (common in everyone)
	Intellectualization (isolation, obsessive behavior, undoing, rationalization)
	Repression
	Reaction formation
	Displacement (conversion, phobias, wit)
	Dissociation (neurotic denial)
Level IV:	Mature mechanisms (common in 'healthy' adults)
	Sublimation
	Altruism
	Suppression
	Anticipation
	Humour

students of personality in the 1930s was ignored. I say unfortunately because the work of these four men and women has affected my interpretation of the results of the Study. Erik Erikson, Anna Freud, Harry Stack Sullivan and Heinz Hartmen all significantly influenced modern understanding of personality; but in 1937-1942 their work was still too novel to shape the early design of the Grant Study.

By 1940 Harry Stack Sullivan had begun to revolutionize the psychodynamic theory of personality. Slowly, Sullivan and his British counterpart, Melanie Klein, led psychiatrists to realize that interpersonal, relations played as important a role in shaping personality as did the intrapersonal relations between ego, conscience and instinct, but not before the Grant Study was well under way. For example, although in college the psychiatric interviews had included a careful history of adolescent sexual development, the Study psychiatrists did not inquire into the boys' friendship patterns, or their efforts at heterosexual intimacy. Not until 1950, really, did the Grant Study begin to pay close attention to the men's relationships with older men and women.

In 1937 Anna Freud first published in English 'The Ego and The Mechanisms of Defense' and Heinz Hartmann had presented German 'Ego Psychology and the Problem of Adaptation'. Not until 1967 did the Grant Study focus on these men's styles of psychological adaptation.

In the late 1930s at the University of California Erikson had begun the work that in 1950 was to culminate in 'Childhood and Society'-providing convincing evidence that adults mature as well as children. During the same period, the Grant Study staff, like their colleagues elsewhere, saw psychodynamic maturation as being largely completed by adolescence.

Even though longitudinal studies overcome the problems of comparing different cohorts, they nevertheless remain historically bound. This means that generalizations to different cohort groups can only be made on the assumption that historical variation is unimportant.

Is it possible to avoid the influence of historical variation? The answer to this question rests heavily on one's analysis of how history and culture influence the psychological make-up of individuals. From a research design of view it is certainly possible to control for historical effects by using some combination of longitudinal and cross-sectional designs.

Vertical columns in Figure would represent a cross-sectional sequence where all four cohort groups are investigated twice, once in 1970 and again in 1980. Similarly, combining the bottom two rows would represent a longitudinal sequence, where two cohort groups are investigated simultaneously over a number of years. Though such techniques it is possible to obtain data about the effects of cohort differences, time-of-easurement differences and age differences. For example, the differences between 20-year-olds can be compared with the differences between 30-year-olds in order to gauge the effect of cohort membership on the general difference between 20- and 30-year-olds. This, in effect, is a way of 'controlling' for historical variation. But the control gained through such a practice is very limited. First, it depends on whether the changes being monitored are easily quantifiable. In fact, most of the studies of this kind have been developed by those with an interest in measuring the development of human abilities, especially intellectual development. The research designs employed were initially intended to partial out the historical effects of improvements in educational provision during or between the lifetimes of the subjects being studied. This is easy to do when it is simply a matter of comparing test scores, but it is a dubious task to take such comparisons with qualitative data of the king found in adult personality development. Second, there is an assumption that the impact of histories linear and cumulative. But this is an untenable assumption.

Another way of minimizing the impact of historical variation on developmental research is to gather 'data' of a high level of generality. For example, Lowenthal et al. used a cross-sectional technique to investigate the adaptive processes of men and women across the life-span. In their study they documented such general psychological qualities as complexity, self-image, expressiveness and perceptions in continuity of value structure. The biographical interview technique of Levinson was primarily aimed at elucidating changes in the relationship between self and world throughout the life course. Loevinger was also concerned with the rather abstract notion of ego as a central frame of reference for understanding self and others. However, a closer look at this research will still reveal its social and historical specificity.

Social and historical bias

In the immediately preceeding section on methodological difficulties I outlined some of the research design problems when comparing different people of different ages at a given time or when comparing the same people at different ages.

Unfortunately, research in adult development, especially the genre concerned with life 'stages' or 'phases', seems prone and historical bias. This is evident in four ways; the existence of purely descriptive inventories of life 'tasks', the selection of subjects for research, the data gathering techniques, and the way in which the concept of the 'healthy' personality is constructed.

Descriptive inventories

This approach, whereby an inventory of life tasks is constructed, has its origins in Havighurst's Developmental Tasks and Education which was written in the early 1940s. It is similar to the inventory of McCoy and the same objections apply here. It is worthwhile noting, however, Havighurst's comments on his original inventory.

The tasks the individual must learn – the developmental task of life-are those things that constitute healthy and satisfactory growth in our society. They are the things a person must learn if he is to be judged and to judge himself to be a reasonably happy and successful person. A developmental task is a task which arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks.

Thus the developmental tasks of life amount to a socially approved timetable for individual growth and development. In a pluralistic society this timetable will differ between social groups. While it may be useful to identify the developmental tasks of particular social or community groups, as Tucker and Huerta have done in their study of Mexican-American females, it is dangerous to generalize about the developmental tasks of society as such.

Sample selection, data gathering techniques

Table sets out the sample, method and developmental processes identified by each of six well-known adult developmental psychologists. Five of these gathered data prior to formulating their views about adult development. An impressionistic description of the samples used is that they consisted of North American, white, middle class, better educated, predominantly male subjects.

The techniques for gathering data were the structured interview, questionnaire, self-rating checklist, standard psychological test and observer rating. But one should be wary of accepting reported results without a detailed knowledge of how these techniques were applied in each case.

Conceptions of the healthy personality

Development implies growth and progress, not merely change. But growth and progress towards what end? The answer to this question is often the starting point for theories of adult development, and it is the conception of the end point of development, the 'mature' or 'healthy' personality which frequently governs how progress and growth is monitored and explained within a given theory. Many developmental psychologists construe the end point of development with terms like 'individuality', 'autonomy' and the 'integrated self'.

But do such descriptions represent a particular way of looking at the world which excludes certain cultures or sections of the population? A closer look may help to resolve this issue. Levinson, for example, makes the following remarks about the 'individuation' prices: Throughout the life cycle, but especially in the key transition periods such as infancy, pubescence and the Mid-life Transition, the developmental process of individuation is going on. This term refers to the changes in a person's relationship to himself and to the external world.

These changes are part of the individuation process. In successive periods of development, as this process goes on, the person forms a clearer boundary between self and world. He forms a stronger sense of who he is and what he wants, and a more realistic, sophisticated view of the world: what it is like, what it offers him and demands from him. Greater individuation allows him to be more separate from the world, to be more independent and self-generating. But it also gives him the confidence and understanding to have more intense attachments in the world and to feel more fully a part of it.

This emphasis on 'separateness', 'independence' and 'self-generation' is the language of the ethic of individualism, it is worthwhile noting the claims of at least one commentator, Gilligan, that the emphasis on the development of individual identity among developmental theories is an aspect of gender bias which pervades the literature. She begins her analysis by referring to the work of Chodorow, who observes that, in general, girls are parented by a person of the same gender while boys are parented by a person if the opposite gender. The significance of this is that the identity of boys is built on the perception of contrast and separateness from their primary caregiver, while the identity of girls is built upon the perception of sameness and attachment to their primary caregiver.

Consequently, relationships, and particularly issues of dependency, are experienced differently by women and men. For boys and men, separation and individuation are critically tied to gender identity since separation from the mother is essential for the development for masculinity. For girls and women, issues of feminity or feminine identity do not depend on the achievement of separation from the mother or on the progress of individuation. Since masculinity is defined through separation while femininity is defined through attachment, male gender identity is threatened by intimacy while female gender identity is threatened by separation. Thus males tend to have difficulty with relationships, while females tend to have problems with individuation. The quality of embeddedness in social interaction and personal relationships that characterizes women's lives in contrast to men's, however, becomes not only a descriptive difference but also a developmental liability when the milestones of childhood and adolescent development in the psychological literature are markets of increasing separation. Women's failure to separate then becomes by definition a failure to develop.

Gilligan then proceeds to cite evidence of the undervaluing of female characteristics—the concern with relationships and responsibilities, empathy and attachment-among developmental theories. For example, Freud considered the persistence of women's pre-Oedipal attachment to their mother to be linked with their failure to resolve completely their Oedipal feelings and their consequent failure to develop a strong superego. This developmental failure in women results in their having little sense of justice:

> The fact that women must be regarded as having little sense of justice is no doubt related to the predominance of envy in their mental life...

Another example comes from Jean Piaget, who observed sex differences in the way children engage in games. Girls, because of their more flexible attitude towards rules and their enforcement were considered to have a less developed legal sense than boys—which is the cornertone of corstone o moral development. The rule is no longer an imperative coming from an adult and accepted without discussion, it is a means of agreement resulting from co-operation itself. But girls are less explicit about this agreement and this is our reason for suspecting them of being less concerned with legal elaborations. A rule is good so long as the game repay it.

Kohlberg too is open to the same criticism. Gilligan observes that his empirical work, which led to the formulation of moral development stages, was based on a sample of boys only. According to Gilligan, this is because the higher stages of kohlberg's scale are constructed from what are traditionally 'male' qualities—the concern with justice and rights rather than with responsibilities and relationships.

The thrust of Gilligan's argument is that womanhood is rarely equated with mature healthy adulthood in much of the adult developmental literature. This is because the healthy personality is too often portrayed from a male perspective, with an emphasis on individuation and autonomy.

The elusive mystery of women's development lies in its recognition of the continuing importance of attachment in the human life cycle. Woman's place in man's life cycle is to protect this recognition while the developmental litany intones the celebration of separation, autonomy, individuation, and natural rights.

Development as a dialectical process

An alternative to documenting the 'stages' and 'phases' of adult life is to understand development as an ongoing dialectical process. The basic notion here is that there is a constant 'dialectic' between the changing or developing person and the changing or evolving society. That is, the person creates, and is created by the society in which he/she lives. Accompanying this notion is the rejection of those psychological approaches which search for stability, equilibrium and balance in the life course. The person is construed as a changing person in a changing world, and the dialectical approach is very much concerned with the dynamics of change.

The preference for an equilibrium model in the behavioral science has been as firmly established as has the preference for abstract traits or competencies. Without any debate it has been taken for granted that a state of balance, stability, and rest is more desirable than a state of upheaval, conflict and change. Thus we have always aimed for a psychology of satisfaction but not of excitement. This preference has found expression in balance theory, equilibrium theory, steady state theory, and indirectly in the theory of cognitive dissonance. With the possible exception for the latter, these interpretations fail to explore the fact that every change has to be explained by the process of imbalance which forms the basis for any movement. Once this prerequisite is recognized, stability appears as a transitory condition in the stream of ceaseless changes.

One source of such change is the historical change in one's culture, the other source is the change associated with one's age-related social category. Such changes are primarily mediated through people interacting in everyday life -thus an investigation of developmental change will entail an analysis of common, everyday interactions and the dialogues contained in them.

Riegel's position has much in common with Berger and Luckmann's exposition for how personal identity is shaped, maintained and transmitted within a given social order. Their analysis offers a powerful account of how personal identity is a social construction which, especially in a modern pluralistic society, is constantly open to change and transformation. What is meant by the proposition that personal identity is a social construction? Put simply, the idea is as follows:

1 We do not have biologically determined identities;
2 We are all born into a particular social world which has been constructed by humans;
3 We develop a notion of who we are from the way 'significant' others;
4 These 'significant' others represent the social world and mediate it to us.
5 We take on the roles and attitudes of significant others, internalize them and make them our own;
6 We extend our identification with significant others to an identification with society as whole: 'Only by virtue of this generalized identification does his own self-

> identification attain stability and continuity. He now has not only an identity vis-a vis this or that significant other, but an identity in general...'

Identity, as a social construction, needs to be maintained through social interaction. The routines of everyday life serve to confirm the reality of the world and our place in it. In particular, the language used in everyday conversations confirms for us the silent, taken-for-granted world that forms the foundation of our personal identity. In modern pluralistic society, however, there is a multiplicity of world views or realities. Because there is no common social reality there is no socially produced stable structure of personal identity. This means that achieving a stable personal identity in modern society becomes an individual, private enterprise. Moreover, the possibility of transforming one's identity is always present. Indeed, one could argue that many life events require a change or re-orientation of identity.

Berger and Luckmann maintain that any transformation of identity requires a process of re-socialization. In extreme cases, such as with religious conversion, there may be a complete dismantling of one's former identity. This would require the following:

1 Affiliation with the new community;

2 Segregation for the individual from the inhabitants of other 'worlds', especially those from the 'world' being left behind;

3 A reinterpretation of the old 'reality ' in terms of the new 'reality'

Each of these steps can be recognized as extreme versions of what happens to many adults as they develop new personal, family, work and leisure pursuits. The difference between this analysis and the life-span development literature is that transformation does not imply a move towards some state of maturity—it simply means change, not improvement. Also, there are no propositions about the regularity and predictability of change—only that personal identity is open to change, subject to the existence of a community of others who maintain the change through discourse in everyday life.

The idea of the malleability of personal identity is both a source of hope and an occasion for despair. Hope, because it means that change is always possible' despair, because it implies that a belief in the real, true, authentic self is a fanciful indulgence.

The studies cited in this chapter represent only a sampling of a rich and diverse field of enquiry. They were chosen to reveal some of the pitfalls in theory and research in adult development. Adult development is, in principle germane to anyone with an interest in adult education. Too often, however, people with an applied intent will latch on to an easily assimilated theory, one which clearly differentiates and orders the 'phases' or 'stages' of life and which advances an unambiguous account of the process and end point of development. Adult educators may find such theories useful but they need to be wary of the methodological and conceptual difficulties. They also need to be mindful of the impact such theories have on shaping and maintaining conventionally held views about what it means to be a mature, healthy adult.

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